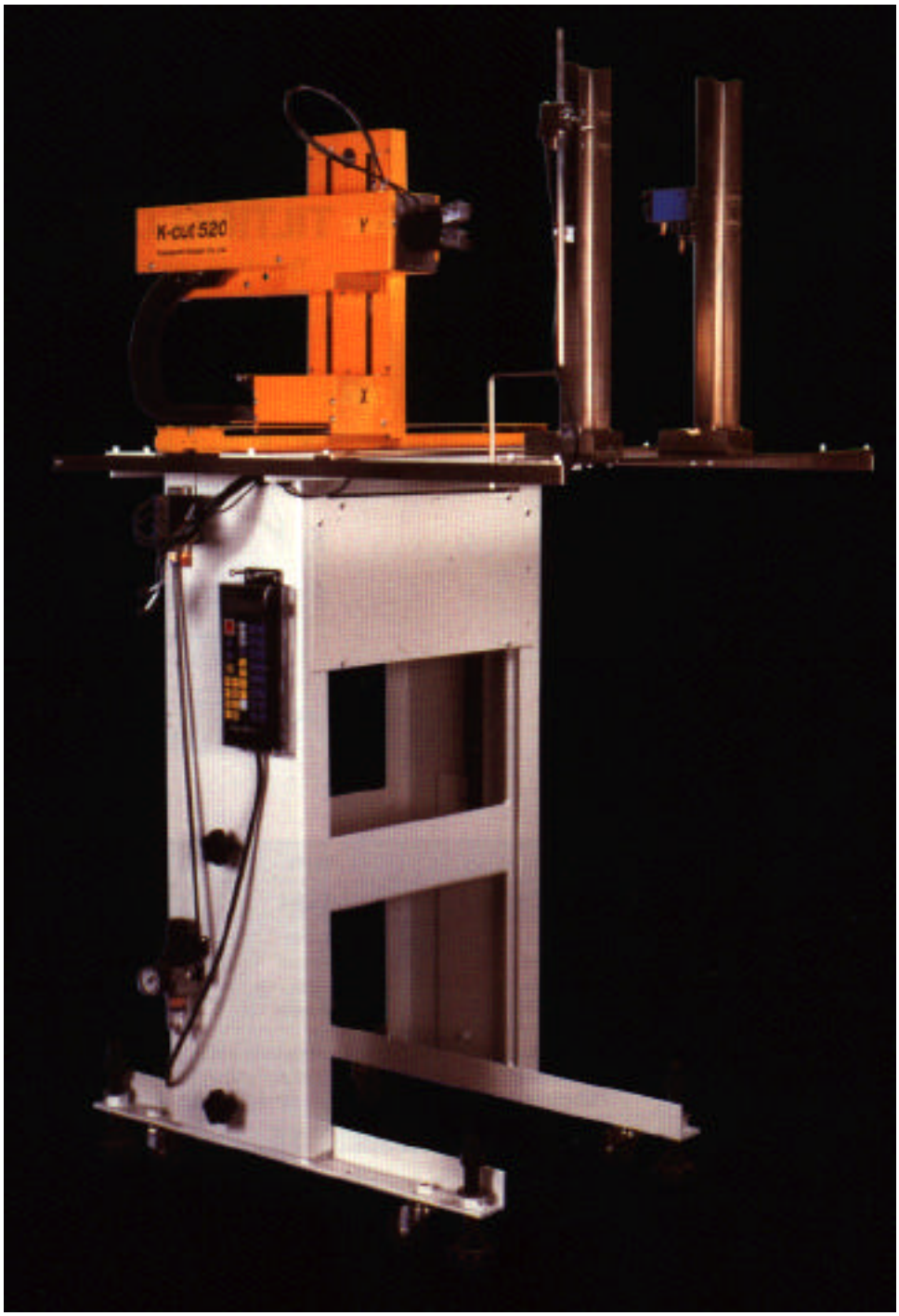
# KAWAGUCHI K-CUT 520

## OWNERS MANUAL




11/01/97

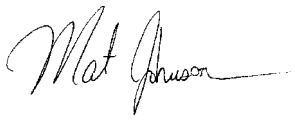
*Thank you,*

*We appreciate that you have chosen the Kawaguchi K-cut 520 for your de-gating and parts sorting needs. We know that the K-cut can be a great asset to your company and we are willing to prove it. If you have just received your K-cut then you are on a temporary trial. During this trial we can work together to make the K-cut operate as smoothly as possible on all of the jobs that you have for it.*

*We are committed to offering superior technical support. You can reach us by mail, phone, fax or on the Internet. We send a technician to help with the initial setup and to instruct people at your company on how to use every facet of the 520's. We suggest that you have appropriate time set aside for each person who will be trained. After the training we follow up with continued technical support. We answer your questions right away and if necessary we send you solutions in the form of drawings, 3D animation, video or complete hardware setups. This is not to say that we expect the 520 to be difficult to use -as a matter of fact it is extremely easy to program and run- it is just to say that we are here before, during and long after your purchase.*

*Again, thank you for choosing the K-cut and please let us know what you think of your product and service.*

Mat Johnson



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# SAFETY PRECAUTIONS

**HAZARD**

**Improper grounding of this equipment could result in a risk of electrical shock**

**PREVENTION**

- This product must be grounded to avoid the possibility of electrical shock. In the event of an electrical short circuit, grounding reduces the risk of electrical shock by providing an escape wire for the electric current.
- This equipment comes with a blue and white power reducer/surge protector box that should be used as the robots power source.
- The wall outlet that you use with the included power reducer/surge protector must be properly installed and grounded in accordance with all local codes and ordinances.
- If the cord or electrical connections become damaged, then call a qualified electrician or service person to make the necessary repairs.

**HAZARD**

**Moving parts can cause harm to operators and passersby**

**PREVENTION**

- Only trained personnel should operate and adjust the robot.
- All personnel should stay clear of the robot during operation.
- During operation and programming all personnel should stay clear of the pneumatic functions, particularly the cutting devices.
- Guards or diverters should be set into place to disallow the opportunity for plastic parts to ‘fly’ out and hit passersby.
- Frequently check all bolts and screws on the robot and fixtures to ensure that they stay tight.
- Perform regular maintenance.

**HAZARD**

**High pressure pneumatic lines can cause skin injection or other harm to befall personnel**

**PREVENTION**

- Frequently check the air hoses for punctures or wear. If you locate damage do not attempt to repair it; replace the damaged part(s).
- Never operate the robot and pneumatics above recommended pressures.

**Follow all OSHA, federal and local ordinances required for this equipment.**

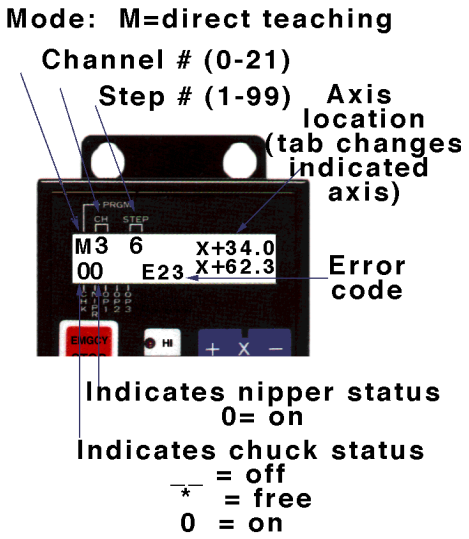
# COMPONENTS

## THE PENDANT DISPLAY

The pendant is used as an interface between the user and the robot. Included with the robot and in this manual is a detailed description of each button's functions.

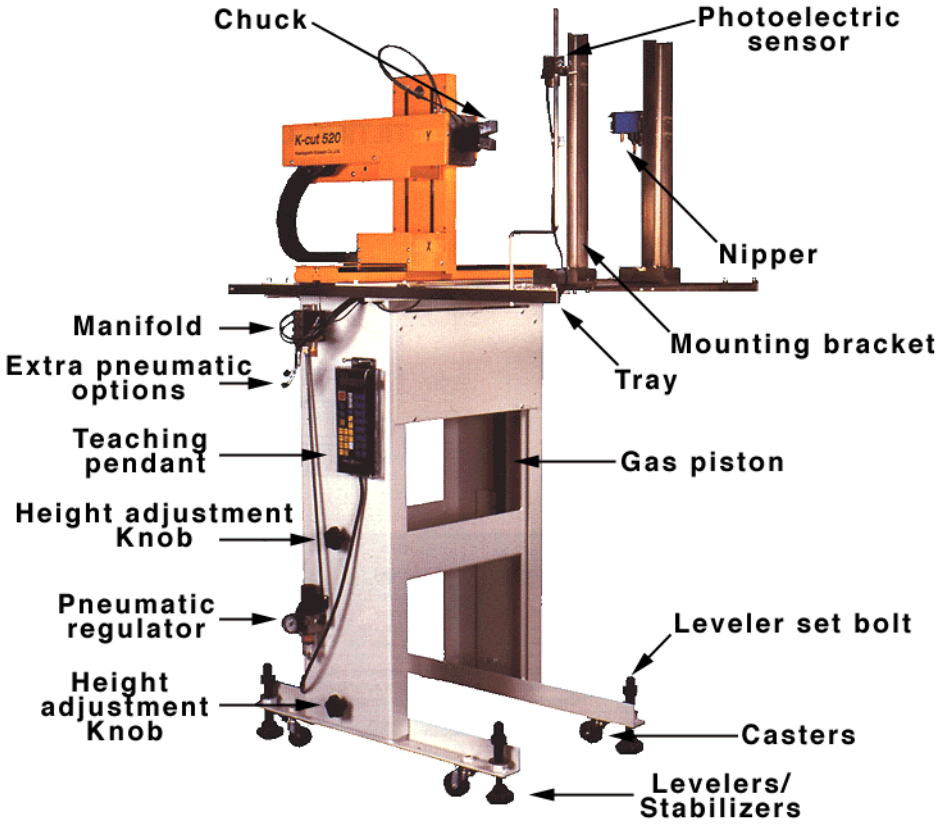
In the top left of the display is the Mode. **P** is displayed when the robot is returning to the origin. **R** is displayed when the robot is in automatic operation. **M** indicates that it is in direct teaching mode for manual operation and programming.

- The number immediately to the right of the mode is the channel. There are channels 0 to 21, with 1 to 20 designated for programs. To the right of the channel and separated by a '/' is the step number. Each channel has steps 0 to 99.
- The far right of the display indicates the location of the axis. By pressing the TAB button on the pendant you can see the location of each of the axis. The numbers represent the distance from the origin.
- The 5 numbers in the lower left indicate the pneumatic functions. On the far left is the chuck. For the chuck '*' indicates that the chuck is free of pneumatic pressure,'-' indicates that is forced open and '0' indicates that it is forced shut.
- The next number is the for the nipper function. When there is a 0 there it indicates that it is on (will perform its pneumatic function).
- The next three numbers are for options 1, 2 and 3. In each case 0 indicates that they are on (will perform their pneumatic function).




# COMPONENTS

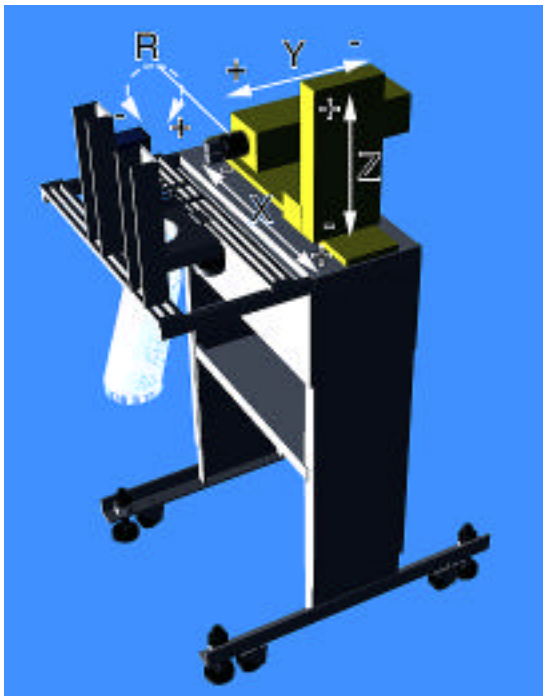
Pneumatic options and the sorter are not indicated here. For information on the options and sorter, see those sections later in this manual.



# SPECIFICATIONS

## OPERATING RANGE

| | | |
|---|---|---|
| X axis longitudinal | 470mm | 18.5in |
| Y axis transverse | 200mm | 7.9 in |
| Z axis vertical | 200mm | 7.9 in |
| R axis rotation | ±220˚ | |




## WORKING SPEED

| | | |
|---|---|---|
| X axis longitudinal | 750mm/sec | 28.8 in/sec |
| Y axis transverse | 750mm/sec | 28.8 in/sec |
| Z axis vertical | 750mm/sec | 28.8 in/sec |

## EXTERNAL DIMENSIONS

(L) 865mmX(W) 650mm(H) 1,430~1,845mm
(L) 34.0 in X(W) 25.6 in (H) 56.3~72.6 in

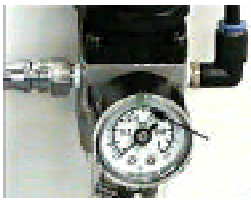
## WEIGHT

110kg 240lbs

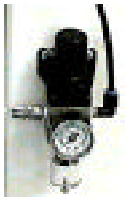
## POWER

Requires 100VAC, 50/60Hz Consumes 200W/hr

## AIR REQUIREMENTS



Air input from the built in regulator should be 4~5kg or about 70lbs/in$^2$. The regulator pictured here indicates the factory preset. This is the recommended pressure for optimum use. The knob on the top of the supplied regulator will adjust the pressure to the 520. There are two green lines with a slot between them; the pressure should be set to that point.

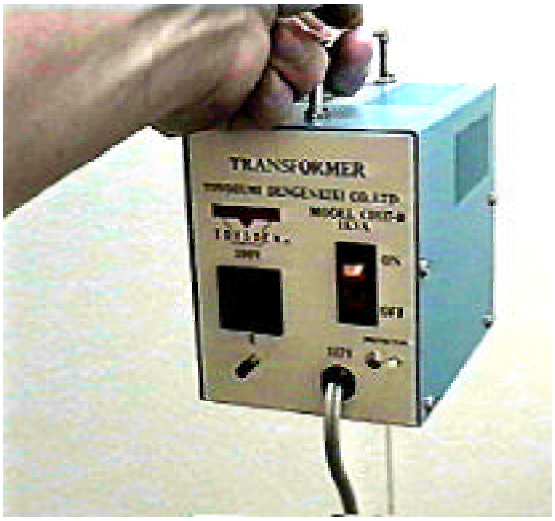


## OPERATING CONDITIONS

Temperatures of 0˚ to 40˚C or 32˚ to 104˚F are acceptable. Humidity must be from 20%~80%RH.

## ACCURACY OF REPEATED LOCATION

Mechanical repeatability is ±0.1mm. In other words the axis will go to preset locations within 0.1mm. With hardware enhancements this can be improved upon.




## GROUNDING AND THE INCLUDED TRANSFORMER

A transformer like the one to the right is supplied with your K-cut 520. This transformer plugs into a 110V outlet and has the 100V output required for the 520 to function properly. There is an on/off switch on the transformer so that plugging and unplugging isn't necessary.

The transformer has a three plug socket built in but has a two plug connection to the wall. To properly ground the transformer use the supplied green or black wire. Attach the wire to the transformer at one end and attach the other end to an appropriate ground. This is required for safe operation of the K-cut 520.

# THE MEMORY CARD

Your 520 comes, standard, with one memory card. Each memory card has channels 0 thru 21. Channel 0 is for timer delays, channel 21 is for recovery of the last cleared channel and 1 thru 20 hold programs. If you need additional memory cards please call Kawaguchi America to place an order. They are in stock and available for overnight delivery.

**⚠CAUTION**

- This card is not recommended for use with other systems.
- Never clean the card with volatile chemicals such as alcohol. Use of such chemicals could cause the panels of the card to come off. To clean the card use a blast of dry air or a dry cloth.
- Do not apply strong force to the card or bend it in any way. Store the card in the supplied pouch and in a dry place.
- Keep the card free from water and direct sun.
- Do not disassemble, insert metals into or subject the card to magnetic forces.

This card is guaranteed for 1 year after shipment. If the card is found to be defective, during warrantee due to inadequate manufacturing, then it will be replaced at no cost. *all stored data is outside of the warranty.

### *INSERTING THE CARD INTO THE ROBOT*

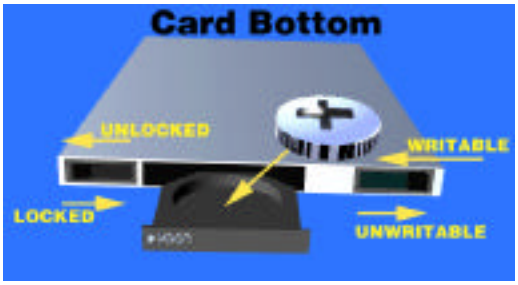
Always make sure that the power is off when inserting or removing a memory card. The memory card inserts on the back panel of the K-cut 520.

The two graphics here show the appropriate way to insert the card. Notice that the front of the card, where is says 'MEMORY CARD' is facing the power off button. With the top edge of the card parallel to the floor and perpendicular to the 520, gently push it in. When the card contacts the plug in the robot there will be slight resistance. Push gently until you feel that the card is completely seated. If you are properly aligned the card should slide in with only a little resistance. Now you may power up the 520 and test to see if it is functioning properly. If there are problems, then turn the power off, remove and reinsert the card and try again. If there are still problems your card may be damaged; you will need to call Technical Service to determine this.

### *CHANGING THE MEMORY CARD'S BATTERY*

Each memory card comes with a battery so that you can remove it or turn the power off on the 520 without effecting the stored programs. Each battery has a 5 year life expectancy. To remove the battery without loosing your programs, leave it plugged into the K-cut, with the K-cut's power on. While the power is on, slide the lock switch to unlock. Slide the battery tray out, take note of the tray and battery position, then remove the battery. Replace the battery only with one made specifically for this card and then replace the tray. Slide the lock on and test the card.

### *WRITE PROTECTION*




To protect the programs so that they will not be edited you can use the write protection option on the card. The graphics here show how you can turn the write protection on and off. This works just like a computer floppy disk.

# PROGRAMMING

## OVERVIEW

The K-cut 520 has 20 programmable channels per memory card. Each channel is capable of holding an individual program of up to 100 steps. The programs in the memory are independent of each other. Each program will be responsible for degating a specific mold. Once in memory a program will stay there until you clear it (it remains even if you unplug the robot for extended periods).

### *THERE ARE 2 ADDITIONAL CHANNELS*

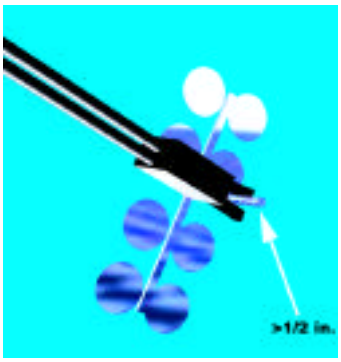
Channel 0 holds the timer delays for functions such as Chuck On, Start Delay, Pull Nipper etc.. The programmable timer delays in this channel will effect all other channels. A detailed description of when and how to use this channel is provided later in this section.

### *PROGRAMMING CONCEPT*

The K-cut 520 uses the direct teaching method; meaning that you give it a part, teach it what movements to make, save it and then it automatically repeats the movements. In the program mode, every time you press SET you lay in a point. The 520 goes from step (set point) to step via the shortest route, using simultaneous movement. A good thing to understand about simultaneous movement and shortest route programming is that if you lay in a step on one side of an obstacle, walk it around that obstacle and finally lay in the next step on the other side of the obstacle, then the 520 will take the shortest route between the steps and hit the obstacle. It doesn't remember any movements other than the positions of each laid-in step.

## WHERE TO BEGIN

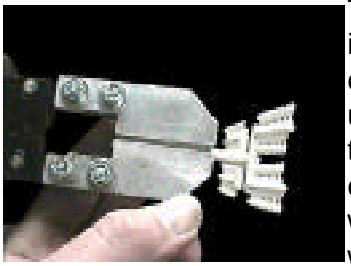
Before you begin programming you will need to consider the fixtures. Fixtures being the chuck, cutters, locators and other pneumatics.




### *TEST THE HAND OFF*

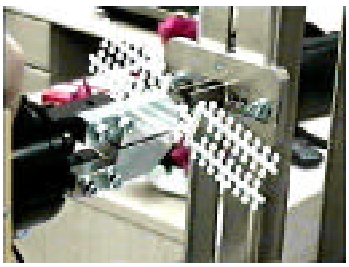
Make sure that the sprue picker leaves at least half of an inch of solid sprue hanging out for the K-cut to grab. Check to make sure that it delivers the part out to a position low enough for the K-cut to reach and that it will hold that position for at least 1 second. If these needs can not be met you may need a pneumatic tray, tilting chuck or other accessories. Refer to the appropriate sections of this manual for further information.

### *TEST THE CHUCK*



To do this, disconnect the air and power source to the K-cut. Take a part that you intend to degate and test it in the chuck. Do this by grabbing the chuck (with it still on the robot), open it and with one hand hold the sprue within the chuck's jaws and use your other hand to close the chuck jaws onto the part. Now you can make sure that the sprue sits firmly in the jaws. Test to make sure that the sprue is held firmly enough to not allow the part to rotate easily, that with the chuck held loosely the part will slide smoothly in and out and that the runner or parts do not droop. If problems with the chuck exist then refer to the sections on the chuck and setups later in this manual.

### *TEST THE LOCATOR*

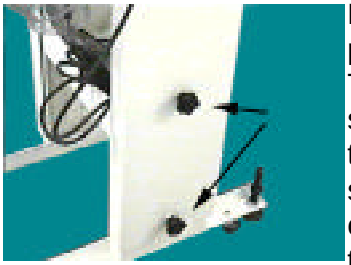


With the part still held firmly in the chuck with your hand, mimic the movement of the robot and make sure the part can reach the locator. Make sure that the locator is set to a good width, that the center bolt is in the correct position and that the 'Vs' or other location does not interfere with the runner or parts. For further information refer to the section on locators.

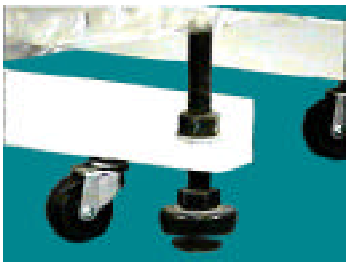
### *TEST THE NIPPERS AND BLADES*

With your hand firmly holding a part in the chuck, simulate the robot's movements into the nippers to make sure that each cut can be reached. Next make sure that the cuts are located over where you want them to fall. Test to see that the parts can easily enter the blades without hitting or rubbing on them. Take the part out of the chuck and simulate the robots chuck by holding the part by the sprue and placing it into the blades in position to degate one part. Now with the air on, press the button on the top of the solenoid connected to the nipper to make the blades cut (refer to the graphic). Another way to do this is to stand back and power up the K-cut. With the sprue in one hand and the pendant in the other, simulate a cut by holding the part in the blades and then pressing the **Nipper** button twice. If you need further information on nippers and blades then refer to the nipper and blades sections. For other cuttings fixtures refer to the setups section or call Technical Service.

### *SETUP THE HAND-OFF*



Run a part out on the sprue and stop it at the hand off position. Roll the 520 into position and adjust the height to easily meet the hand off.



To adjust the height loosen the 4 set knobs (2 on either side of the frame) and have one person on either side of the K-cut lift it up to the correct height and retighten the set knobs (refer to the graphic). Carefully position the K-cut so that the sprue is parallel to the chuck, Conclude the positioning by lowering the set feet, with the supplied wrench to lock it into position. Make sure that the robot is grounded, has power and air connected and then you are ready to program.

### *SELECT YOU CHANNEL*

Stand clear and power up the robot. Take the teaching pendant and press **Origin** (the robot will find its proper axis positions and default to the last channel used). Select the channel that you want to program into. To do this press the **Channel** button, the channel number indicator on the display should begin to blink. To move to the channel that you want, press the **+ STEP-** button until the number of the channel that you desire appears on the display; press **SET**. At this point the channel that you have selected should be indicated on the display and should not be blinking.

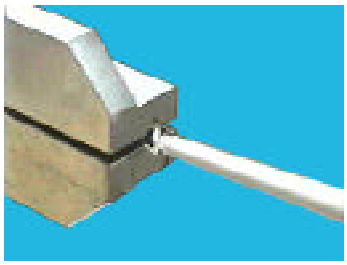
### *INITIATE PROGRAM MODE*

Press **Origin** and the robot will go to the channel origin. To enter programming mode you press the **Enter Change** button. The indicator light next to **Enter** should go on meaning that you are in program mode and are ready for the next step. If the light next to **Change** goes on too then you are in edit mode (meaning that there is already a program occupying this channel).

If both indicators are on you may want to change to an empty channel or you can clear the channel. To clear the channel be sure **Enter Change** is selected and then press **Clear**. The display will ask you to confirm: do this by pressing the **SET** button. If after you press the **Enter Change** button and before you press **Clear** you change your mind and do not want to clear the program then press **Enter Change** again (the lights should go out). If you have cleared the channel and change your mind you may still recover the program from channel 21. This procedure is explained later in this section.

### *SETTING THE ORIGIN*

With the light next to **Enter** of the **Enter Change** button on, you are ready to set the program origin.



Press **Chuck On** (the chuck should close firmly). Using the **X,Z,Y** and **R** axis , position the chuck so that its groove aligns with the end of the sprue (refer to the graphic). Now press **Y-** to back away from the sprue at least 4 inches. Press **Chuck Off**. Press the **HI** button (this sets the speed of the origin so at the end of the cycle it will return quickly to this position). So far none of you movements have

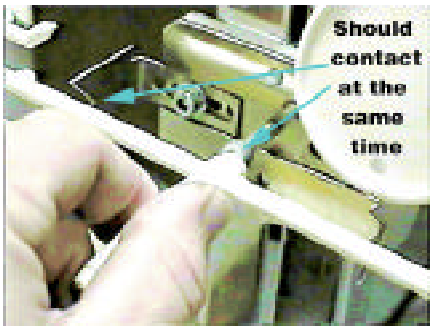
been entered into memory. To make your current position the channel origin, press **Chuck Off** and then the **SET** button. The step number on the display should have changed from 0 to 1.

### *SETTING THE HAND OFF*

In the previous step you already aligned the hand off so all you need to do now is press **Y+** until the chuck is in the position to grab the sprue. Press **SET** and the display indicator should move to step 2. Now press **Chuck On** and press **SET**. Have the sprue picker release the part and retract.

### *SETTING THE LOCATION*

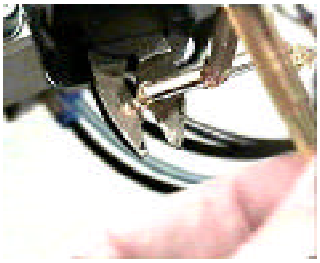
Your locator should be relatively close to your current position. Using the **X**,**Y**,**Z** and **R** axis align the part to the locator by moving it until it barely touches the center bolt and then back it off about 1cm using **Y-**. Press **SET**. Proper alignment means that it is centered so the center bolt will press on the end of the sprue and the runners will move into the center of the locator's 'V' simultaneously.




Press **Chuck Free** (this will loosen the chuck without opening it, allowing the sprue to move freely within). Press **SET**. Press **Y+** to move the part into a specific depth while aligning the runner. When you have reached a proper depth (usually all of the way in) make sure the speed indicator is **LOW** and press **SET.** Press **Chuck On** to firmly grab the part in its new location. Select your speed and press **SET** (you can now return to **MED** or **HI** speed). Press **Y-** until you are easily clear of the locator. Select your speed and press **SET**.

### *MAKING THE CUTS*

Your nipper(s) should be located further down the tray. From your current position use the **X**,**Z**,**Y** and **R** axis to align the part into the first cut. Proper alignment means that the part is about half way into the blades so that when the nipper cuts it will push the flat edge of the blade flush to the part and then cut (refer to the graphic). Back the part(s) out of the nipper(s) far enough so there are no obstructions between its current location and the last set location. Select your speed and press **SET**. Since you are already aligned for the cut you now only need to press **Y+** until you are back into cut position. Select your speed and press **SET**. Press **Nipper** once and press **SET** (*this will cause the nipper to cut*). Back the parts out 2 inches beyond the outside edges of the blades using **Y-** and press **SET**. Repeat this for as many cuts as are needed. (The reason for pre-aligning the cuts is to assure a smooth approach into the blades.)



### *DROPPING THE RUNNER AND SAVING THE PROGRAM*

After your last cut, make sure that you have backed out far enough and press then **SET**. Now use the **X**,**Z**,**Y** and **R** axis to position the runner to where you want to drop it. Make sure that there are no obstructions between this position and the origin. Select your speed and press **SET**. Press **Chuck Off**. Press **SET**. Now you should be at the conclusion of your program so you will need to save and exit program mode. To do this press the **Enter Change** button. The light should go off and the program will be entered into memory. Stand back and press **Origin**.

## TEST YOUR PROGRAM

You probably would like to test your program for errors and cycle time before starting the press. To do this first make sure that you are in **Manual** and at the program origin. Now to manually walk through the steps you press **+Step** once and the display should indicate step 1, then press **SET** to execute it. The robot should have moved from the origin to your first programmed position. You can continue to press **+Step** or **-Step** and **SET** to navigate through your program. When you get to the step where the chuck closes you may wish to manually feed a part to the robot to get a better idea of how accurate your program is. If there are problems then refer to the editing section.

Once you have moved through manually and found the program to be sound you can test the cycle time. Press **Origin**. Press **Start**. When you are ready, put your hand in front of the motion sensor and hold it there. The 520 will run the first couple steps and then should stop and wait at the step were the chuck closes. Start

your timer and pull your hand away from the motion sensor's view. The 520 will now run through the program cycle. If there are problems then refer to the editing or trouble shooting sections of this manual. If all is well then start your press.

## EDITING A PROGRAM

It is common for programs to need slight adjustments. In some cases you can achieve a solution to a step being off position by simply moving a piece of the tooling a little. For example you can achieve tighter cuts by adjusting the position of the nipper or the set bolt for the nipper pull (for further information refer to the Nipper section). Barring mechanical adjustments you can make quick edits to your program in minimal time. Before you edit a program it is suggested that you copy it into another channel (see *copying a program into multiple channels,* on the follow page).

### *EDITING A STEP*

In Manual mode use **+Step** and **SET** buttons to move to the step that you would like to edit. With the step you want to change indicated on the display, press the **Enter Change** button. Manually make any adjustments that you want and then press the **Change Entry** button. The lights will go off indicating that the change has taken place.

### *CHANGING THE SPEED*

To change the speed of steps, put the 520 into manual mode. Press **+Step** and **SET** until the step you want to change the speed of is indicated on the display. Press **Enter Change** and select the new speed. To confirm the change press **Change Entry**.

### *ADVANCE EDITING A STEP*

Occasionally you may need to edit a step or number of steps without executing them first. To do this, manually move to the position before the one or ones that you want to change by pressing **+Step** and **SET**. When you are one step before the one that you wish to advance edit, press **+Step** (do not press **SET**). The number of the step that you wish to edit should now be indicated on the display. Press **Enter Change**. Move the axis to the new location for this step. Press **Change Entry**. The lights should go out making this the new position for this step.

To continue making advance edits, press **+Step** to move the display to the next step to advance edit (do not press **SET**). Now follow the procedure above.

### *INSERTING A STEP*

**Insert** will place a step in front of the one indicated on the display. To insert a step, manually move to the position just before where you wish to make the new step. Now press +Step so that the next step is indicated on the display (do not press **SET**). Press **Enter Change** and position the axis to were you want the new step to locate. Press **Insert**. The step has been inserted as the number on the display. All of the steps that follow it have been bumped up one number.

### *DELETING A STEP*

**Delete** removes the step indicated on the display. Manually move to the step just before the one you wish to delete. Now press **+Step** (do not press **SET**). The step you want deleted should now be indicated on the display. Press **Delete**. The lights should go off indicating that the step has been deleted.

### *EDITING ON THE 'FLY'*

If you have the press running and the 520 cutting and you just want to make one or two changes to the program, you can do so without stopping the press. This may not be a very good idea when it comes to changing the location, as it is possible to have a collision between the 520 and the picker. If you suspect a collision is nearing you can usually avoid it by pressing **Origin** (this will not work with the **Enter Change** button selected). To change the hand off position on the fly press **Manual** when it is in the origin position. Press **+Step** to get to the step just before the chuck closes (the hand off position) and press **Enter Change**. When the sprue picker delivers the next part carefully adjust as needed and press **Change Entry**. Now you will need to edit the **Chuck On** step. Press **+Step** then **Enter Change**, and finally **Change Entry**. The two steps involved in the

hand off have been changed.
To change a cut on the fly, you can leave the robot in automatic. With the pendant in your hand and a thumb over the **Manual** button, allow the robot to run the part up to where you want to make you adjustments. As the robot is moving into the cut you want, press the **Manual** button (this will stop the robot). Now press **-Step** and **SET**. The robot should not have moved as it always stops one step beyond what is indicated on the display when switching from auto to manual. Now you can manually edit your cut. Start the edit one step before the cut. Press **Enter Change** and position the step before it moves into the blades. Press **Change Entr**y. Press **+Step**, **Enter Chang**e and move the part into the blades. Press **Change Entry**. Press **+Step** (make sure that the 'nipper on' is indicated on the display) and press **Enter Change** and then **Change Entry**. Press **+Step**, **Enter Change** and then **-Y** out beyond the blades. Press **Change Entry**. You have now effectively changed a cut and its related steps.

## CLEARING A CHANNEL

To clear a channel go to the desired channel by pressing **Manua**l, **Channel**, then **+Step** or **-Step** until the desired channel is indicated and then press **SET**. Now press the **Enter Change** button and both of the lights to the left of the button should go on indicating that there is a program located in the channel (If only the light next to **Enter** goes on then the channel is empty). To clear it, press the **Clear** button and it will ask you to confirm: do this by pressing **SET**. The lights to the left of the **Enter Chang**e button should now be off and the channel cleared. If after pressing **Enter Change** you decide not to clear it you can just press **Enter Change** again and leave it untouched. If you have already cleared it and want it back you can still recover it from channel 21.

## RECOVERING A CLEARED CHANNEL

The last channel cleared will be stored into channel 21 by default. To recover it you should first determine a destination channel in 1-20.
Put the 520 into **Manual** mode and press the **Channel** button. Press **+Step** until channel 21 is indicated on the display and then press **SET**. Now press **Enter Change** and then **Copy**. This display will request that you select the destination channel. Do this by pressing **-Step** until it is indicated. Now press **SET**. If you are overwriting an existing program you will have to press **SET** twice. Finally, if the **Enter Change** buttons are still on then press **Enter Change** once to turn them off.

## COPYING A PROGRAM INTO MULTIPLE CHANNELS

If you have open channels it is a good idea to make a copy of a program before you edit it so that if you make a mistake you will not loose ground. To do this, set the 520 into Manual mode and press **Channel**. Use **+Step** or **-Step** to get to the channel that you wish to copy. Press **SET**. Now press **Enter Change**. Press **Copy**. The display will request that you locate the channel that you desire to copy into, do this by pressing **+Step** or - **Step** until it is indicated. Now press **SET**. If you are overwriting a program you will have to press **SET** again. Now press **Enter Change** and the lights should go off indicating that you have copied it into the current channel.

## CHANNEL 0 TIMER DELAYS

The timer delays in channel 0 effect all channels 1-20. Common reasons to change the timers include: Delaying the program initiation to allow the sprue picker more time to position for the hand off, speeding the cycle and controlling the pull nipper. To edit **Channel 0** first go to it and press set. You will see a list of self explanatory functions and delays for each in 0.1 second increments. To scroll through all of them press **Tab**. Use the **+Step** and **-Step** to adjust the delays as you wish. You can change as many at a time as you wish. To lay in the changes press **Enter Change**. The robot should return to the last channel used before these edits and be ready to run. The list below indicates the timers and their effects.

**CHUCK ON** -Time needed to close the chuck
**CHUCK OFF** -Time needed to open the chuck
**PULL NIP** -Time period between pulling and cutting
**CUT ON** -Time period with the blade closed
**CUT OF`** -Time period between open and return
**NIP RET** -Return duration
**OP 1 ON** -Option 1 on duration
**OP 1 OF** -Option 1 off duration
**OP 2 ON** -Option 2 on duration
**OP 2 OF** -Option 2 off duration
**ST STBY** -Time period between step 0 and 1
**CHU STBY** -Time before chuck closes
**1 CY TR** -The time of operation. Power shuts off automatically after this duration
**COUNTER** -Cumulative cycle count

# QUICK PROGRAM

MANUAL Press the Manual button.

.ocate the channel that you want to program into
›y pressing Channel and the +Step- until it is
lisplayed and then press Set.

ORIGIN Press Origin.

›ress the Enter/Change button to enter program
ENTER mode. If both lights come on then you need
HANGE to clear the channel. Press Clear, Set, Set
and then Enter/Change to reenter pro-
ıram mode.

Jse the X,Y,Z,R axis to position the robot to where
/ou would like the program origin. Select the
›utton with the desired speed, press Chuck Off
ınd press Set.

+ Y − Press Y+ until you are in position for the hand-off, then press Set. SET

CHUCK ON Free OFF Press Chuck On and then press Set. SET

+ Y − + X − + Z − + R −

Jse the Y, X, Z, and R axis to move the part to
he edge of the locator and then press Set. SET

CHUCK ON Free OFF Press Chuck Free.

MED Select Med speed and use +Y to move in to the desired depth. + Y −

LOW Press Low and then press Set. SET

CHUCK ON Free OFF Press Chuck On and Set. SET

+ Y − Press Med. Press Y- until the part
is clear of the locator and then Set. SET

+ X − + Z − move in front of the blade(s) for your first cut and then press Set. SI

+ Y − + X − + Z − + R −

Use the Y, X, Z, and R axis to carefully move into position for your first cut(s) and then press Set. SI

NIPPER Press Nipper and press Set. This will make the nipper operate, so make sure that you are clear of its operation. SI

+ Y − Press Y- until you are clear of the nipper and then press Set. SI

Repeat the previous 4 steps for as many cuts as you nee
You may need to use the R axis to rotate for cuts.

+ Y − + X − + Z − + R −

Use the Y, X, Z, and R axis to carefully move into position to drop the runner and then press Set. SI

CHUCK ON Free OFF Press Chuck Off and then press Set. SI

ENTER CHANGE Press the Enter/Change button to enter the program into memory and then press Origin. Your program is complete. ORIG

# QUICK EDIT

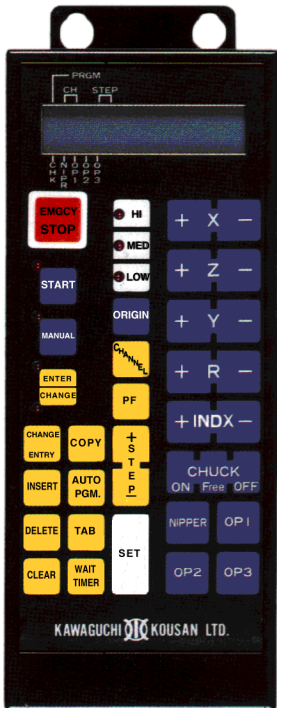
Select Manual mode. Press Origin.

Use +Step and Set to navigate to the step that you wish to change.

Press the Enter/Change button to enact the edit mode.

Adjust the step as needed and then press Change/Entry.

With Enter/Change selected, Insert adds a step before the one indicated on the display; Delete removes the step indicated on the display




EMGCY STOP — This button will shut off the power to the K-cut. There is also a shut down button located on the back panel.

START — Press Origin, then this to put the robot into the start position of the selected program and make it run automatically.

MANUAL — You must press this button to gain manual control over axis and programming. You can press it while a program is running to stop it at a specific point, then press **-Step** and **Set.**

ENTER / CHANGE — This button allows you to program or edit programs. If the light next to Enter goes on, then you are entering a new program. If the light next to Change also goes on then you are editing the step indicated on the display.

CHANGE ENTRY — Press Enter/Change, make your changes and then press this button to confirm the edit. If the edit is made the lights next to Enter/ Change will shut off.

INSERT — With the Enter/Change option selected this button will insert a step before the one indicated on the display.

DELETE — With the Enter/Change option selected this button will delete the step indicated on the display.

CLEAR — With the Enter/Change option selected this button will clear the program from the current channel. You must press Set to confirm.

COPY — With the Enter/Change option selected this button will allow you to copy the selected program to another channel. Use + Step - until the destination channel is indicated on the display, then press SET to confirm.

AUTO PGM. — This button enacts the auto program function.

TAB — This button will tab you through the axis locations that are indicated on the display, or Channel 0 options.

WAIT TIMER — This button will offer the time delay option to insert at steps.

HI / MED / LOW — These buttons set the speed that at which the axis will move. The speed that is selected when you enter a step is the speed that the step will perform at when the program is run.

ORIGIN — This button moves the axis to the start point of the selected program. Press it once for mechanical origin, twice then Manual for program origin.

CHANNEL — With manual selected, press this button and + Step - to scroll to a channel and then press Set to select one.

PF

+ STEP — With manual selected this allows you to scroll the steps.

SET — Press this button operates as a Confirm command. Use it to lay in steps when programming or in manual mode use it with + Step - to manually run steps.

+ X −
+ Z −
+ Y −
+ R −
+ INDX −

On these buttons the letters indicate the axis that are affected. With Manual selected you press these to manipulate the axis. Index is for the sorter.

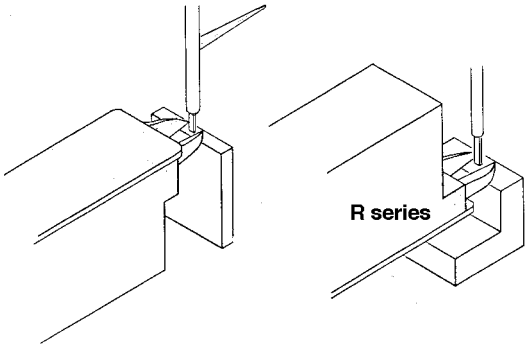
CHUCK ON Free OFF — This button controls the chuck functions.

NIPPER — This button operates the nipper control. Be careful when you use it.

OP1 / OP2 / OP3 — These buttons control optional pneumatic attachments.

# NIPPERS

The operation of the standard nippers are all the same; an air piston with a return spring. The standard nippers come in a variety of sizes. You can view the nippers and their specifications on the following page. The nippers also come in either push or pull. In the first graphic below the nipper on the left is the standard pull direction, and the one on the right is an 'R' style push direction.

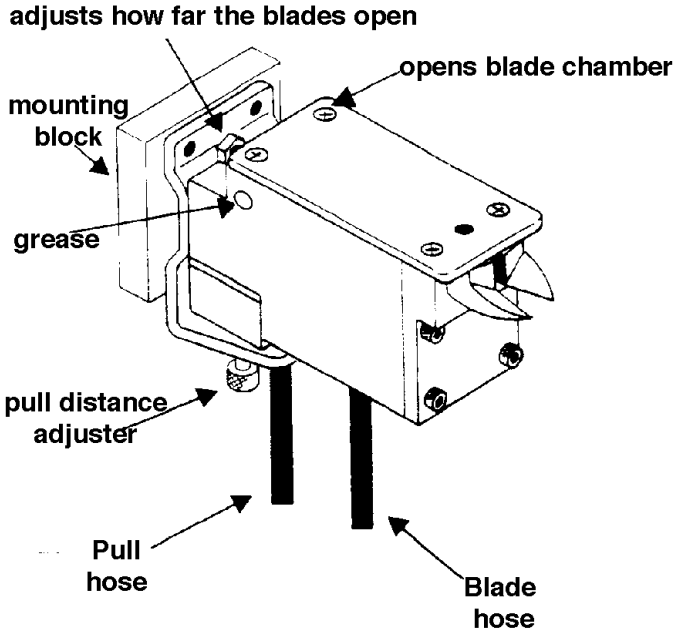



You, of course, are not limited to the standard nipper styles. There are many different types of cutting fixtures available. Guillotine style, electric cutters, air dremmels, punch blades and many more can be made to cut your parts. The K-cut 520 will deliver to the same place, you just need to decide how best to cut.
If you wish to have custom cutters made then contact our Technical Service department and we will help you from step one. There are sample nipper styles and setups for you to consider on the pages following the standard nipper types.

***LOADING BLADES***

Remove 3 of the 4 screws on the silver face of nipper. Slightly loosen the fourth. Slide the panel open and remove the blades. Insert the new blades so that the flat edge is facing in the direction of the pull.

## NIPPER CALL OUT



## ● Main body

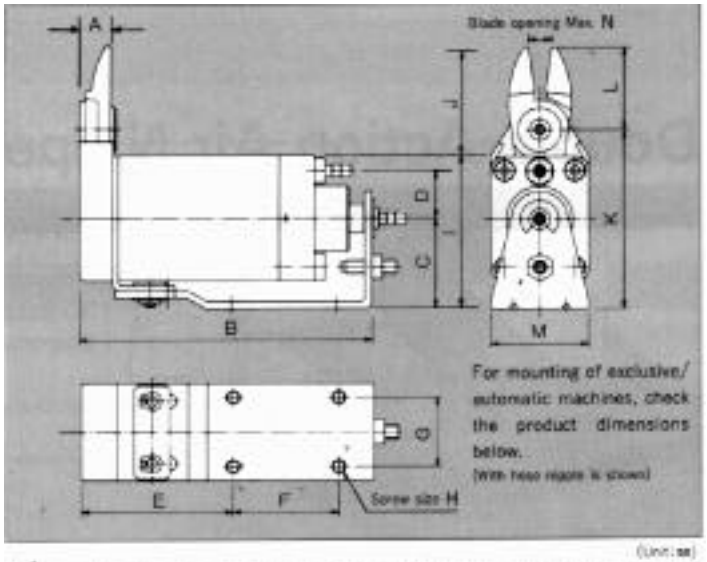
| Model No.GT- | Cutting capacity ABS resin (mm) | Body weight (g) | Air consumption (cc/stroke) | Working air pressure (kgf/cm²) | Pressure (kgf) | Slide range (mm) |
|---|---|---|---|---|---|---|
| NY05 | φ 3.0 | 155 | 48 | 4~5 | 35 | 0~3 |
| NY10 | φ 3.5 | 210 | 68 | 4~5 | 50 | 0~3 |
| NY15 | φ 4.0 | 319 | 136 | 4~5 | 80 | 0~3 |

## ● Spec. of opening to hose

| | | | |
|---|---|---|---|
| With hose nipple (Hose I.D.) | NY05 (R) | NY10 (R) | NY15 (R) |
| | φ 2mm | | |
| With tube fitting (Hose size used) | NY05 (R) -4 | NY10 (R) -4 | NY15 (R) -4 |
| | I.D. φ 2mm × O.D. φ 4mm | | |

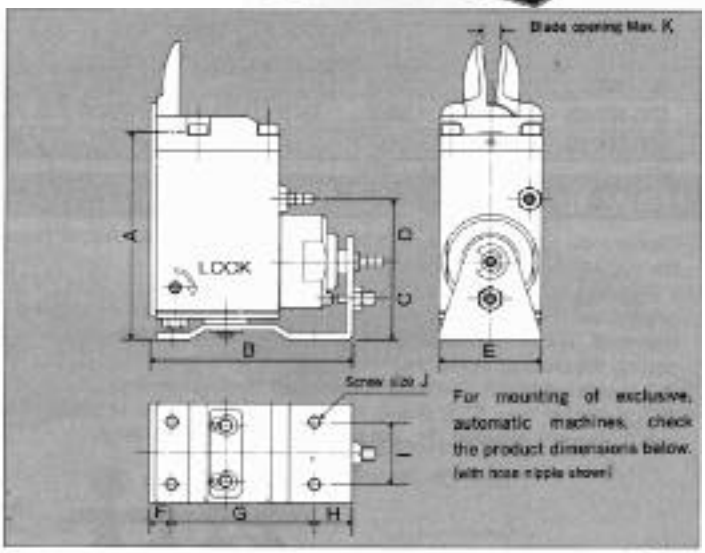
## ● Model list

| Model No.GT- | With hose nipple | | With tube fitting | |
|---|---|---|---|---|
| | Pull | Push | Pull | Push |
| NY05 | NY05 | NY05R | NY05-4 | NY05R-4 |
| NY10 | NY10 | NY10R | NY10-4 | NY10R-4 |
| NY15 | NY15 | NY15R | NY15-4 | NY15R-4 |




(Unit: mm)

| Model No.GT- | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NY05 | 8.6 | 75.9 | 21.6 | 13.3 | 40.9 | 25 | 15 | M4 | 39.1 | 30.5 | 47.6 | 22 | 23 | 4 |
| NY10 | 8.8 | 82.1 | 26.1 | 13.8 | 42.1 | 30 | 20 | M4 | 44 | 31.6 | 51.6 | 24 | 28 | 6 |
| NY15 | 10.2 | 83 | 30 | 16 | 48 | 35 | 25 | M4 | 50.5 | 34.5 | 59 | 27 | 33 | 8 |




(Unit: mm)

| Model No.GT- | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NT03 | 63.1 | 62 | 23.1 | 15 | 19 | 7 | 43 | 12 | 14 | M3 | 3 |
| NT05 | 66.1 | 64 | 25.1 | 20 | 32 | 7 | 45 | 12 | 20 | M4 | 6 |
| NT10 | 83.1 | 73 | 28.1 | 21 | 38 | 8 | 53 | 12 | 24 | M4 | 7 |
| NT20 | 96.1 | 103 | 33.1 | 21.9 | 44 | 10 | 60 | 13 | 28 | M5 | 9 |

## ● Main body

| Model No.GT- | Cutting Capacity ABS resin (mm) | Body weight (g) | Air consumption (cc/stroke) | Working air pressure (kgf/cm²) | Pressure (kgf) | Slide range (mm) |
|---|---|---|---|---|---|---|
| NT03 | φ 1.5 | 178 | 27 | 4~5 | 15 | 0~3 |
| NT05 | φ 2.5 | 325 | 47 | 4~5 | 20 | 0~3 |
| NT10 | φ 3.5 | 515 | 82 | 4~5 | 45 | 0~3 |
| NT20 | φ 5 | 930 | 237 | 4~5 | 95 | 0~8 |

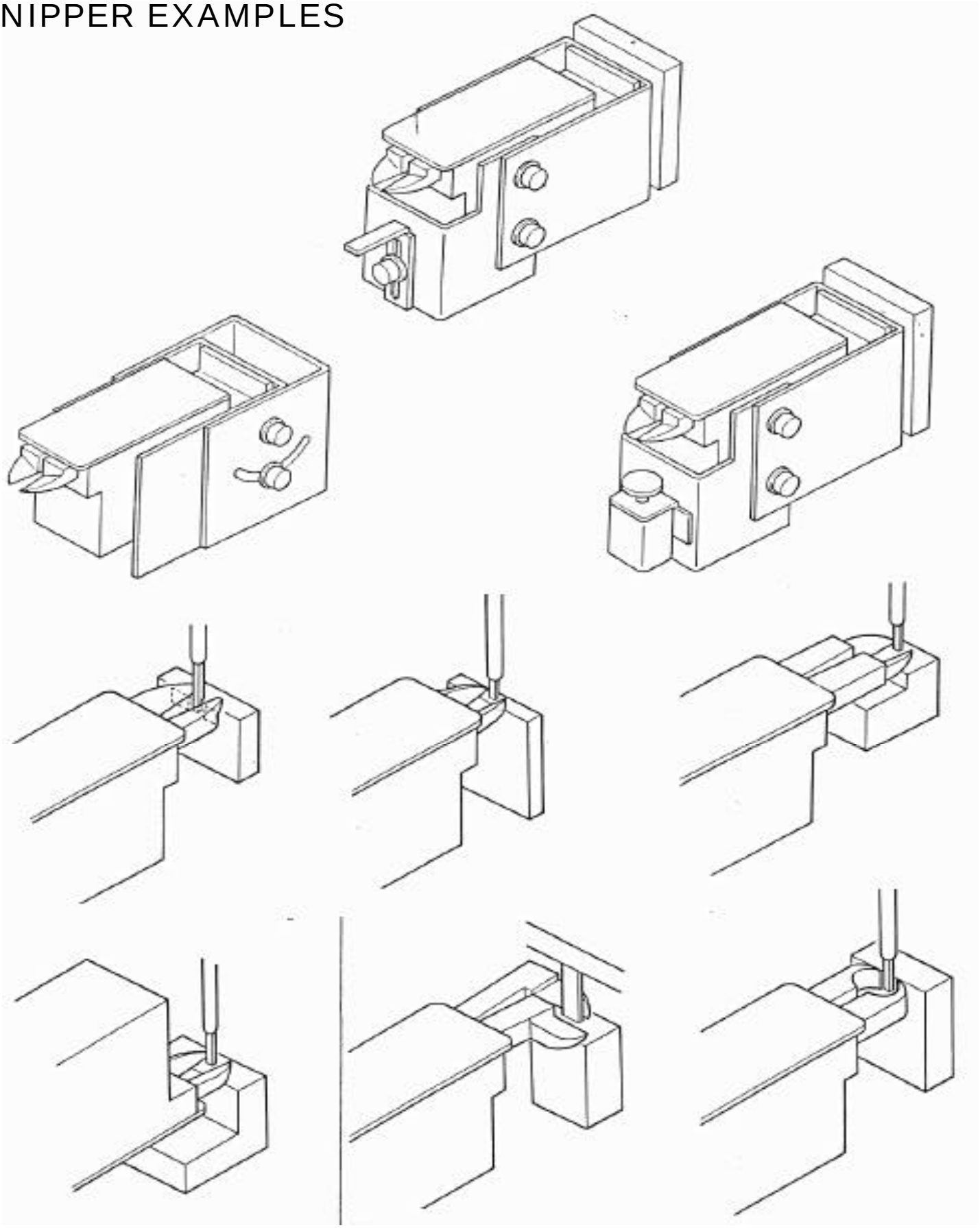
## ● Spec. of opening to hose

| | | | | |
|---|---|---|---|---|
| With hose nipple (Hose I.D.) | NT03 (R) | NT05 (R) | NT10 (R) | NT20 (R) |
| | φ 3.8mm | | | φ 4.0mm |
| With tube fitting (Hose size used) | NT03 (R) -4 | NT05 (R) -4 | NT10 (R) -6 | NT20 (R) -6 |
| | I.D.2mm × O.D.4mm | | I.D.4mm × O.D.6mm | |

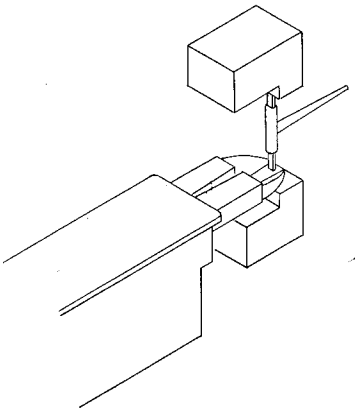
## ● Model list

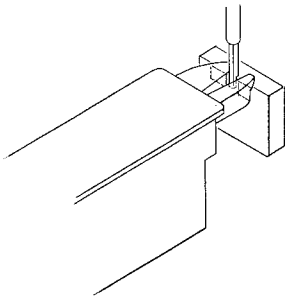
| Model No.GT- | With hose nipple | | With tube fitting | |
|---|---|---|---|---|
| | Pull | Push | Pull | Push |
| NT03 | NT03 | NT03R | NT03-4 | NT03R-4 |
| NT05 | NT05 | NT05R | NT05-4 | NT05R-4 |
| NT10 | NT10 | NT10R | NT10-6 | NT10R-6 |
| NT20 | NT20 | NT20R | NT20-8 | NT20R-6 |

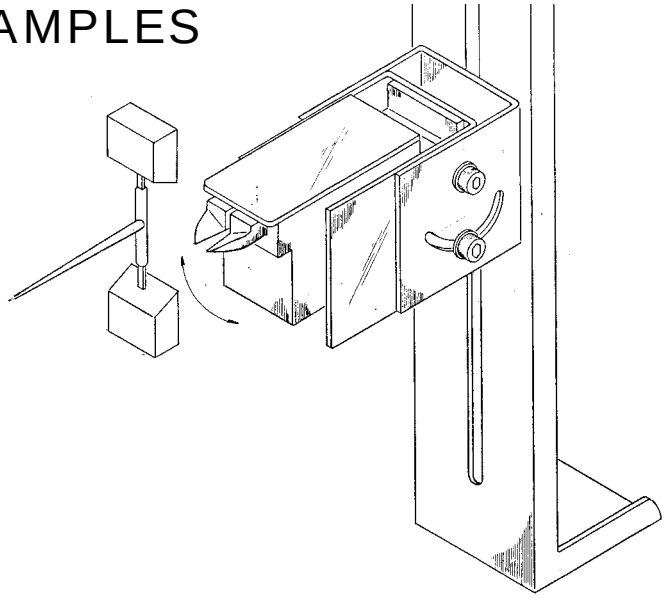
# NIPPER EXAMPLES

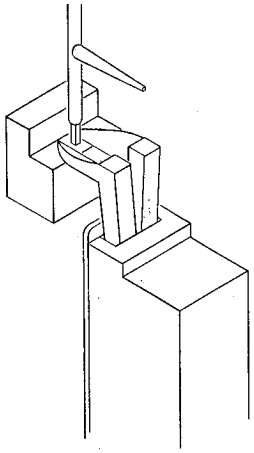


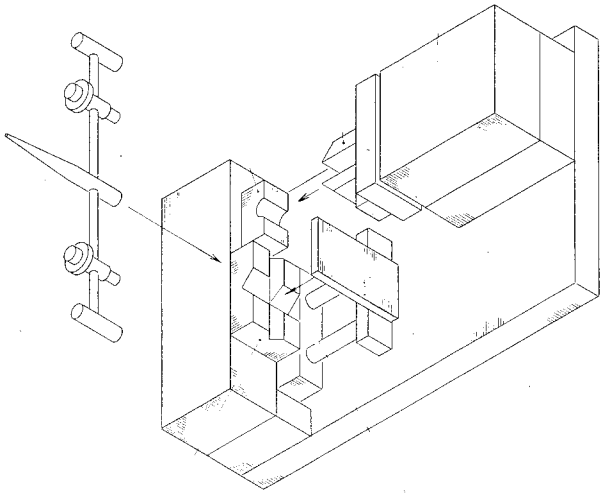
# NIPPER EXAMPLES

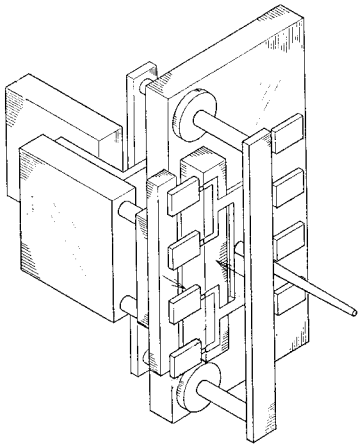


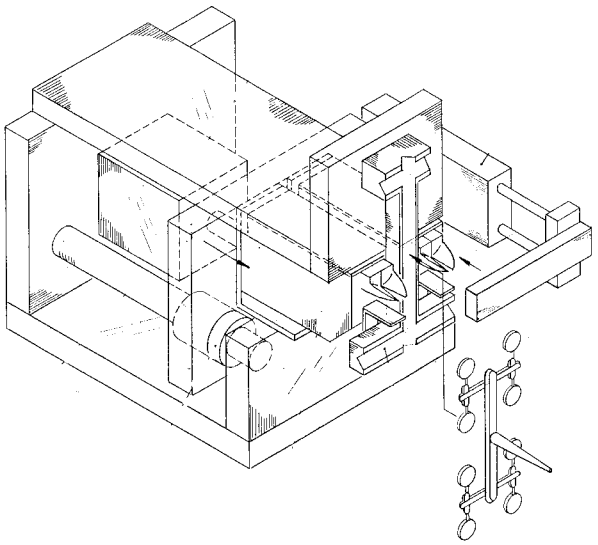


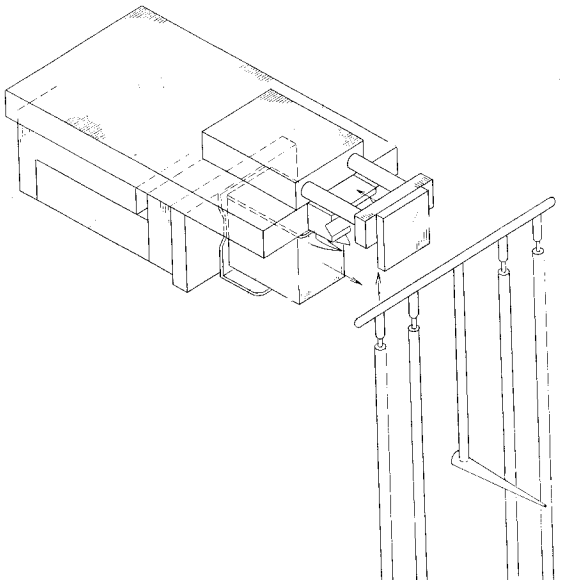




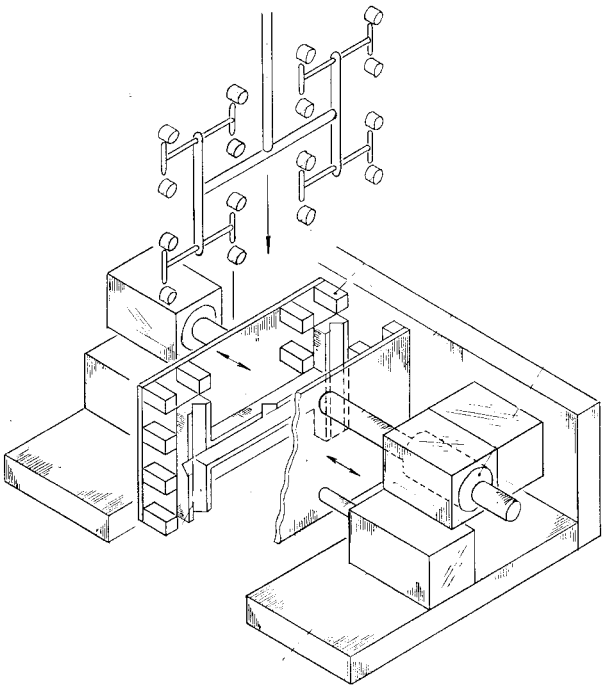


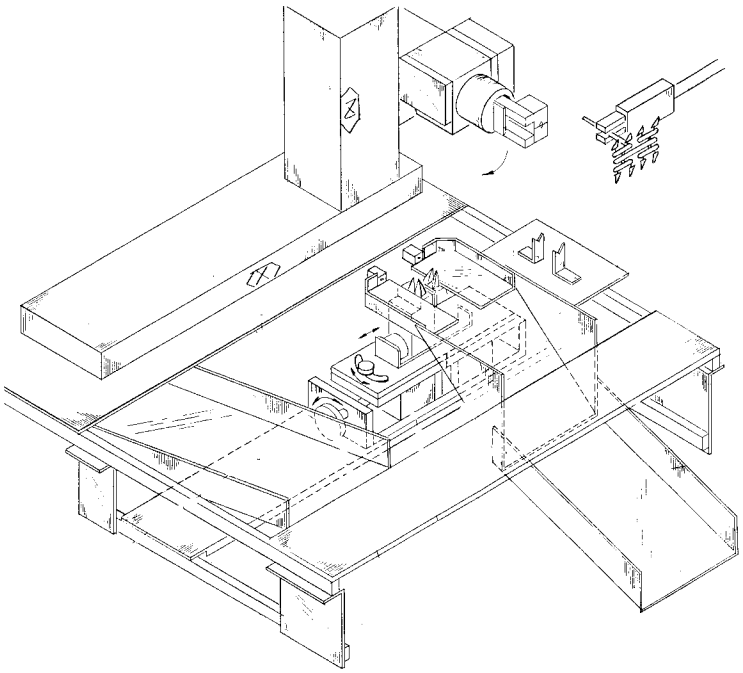


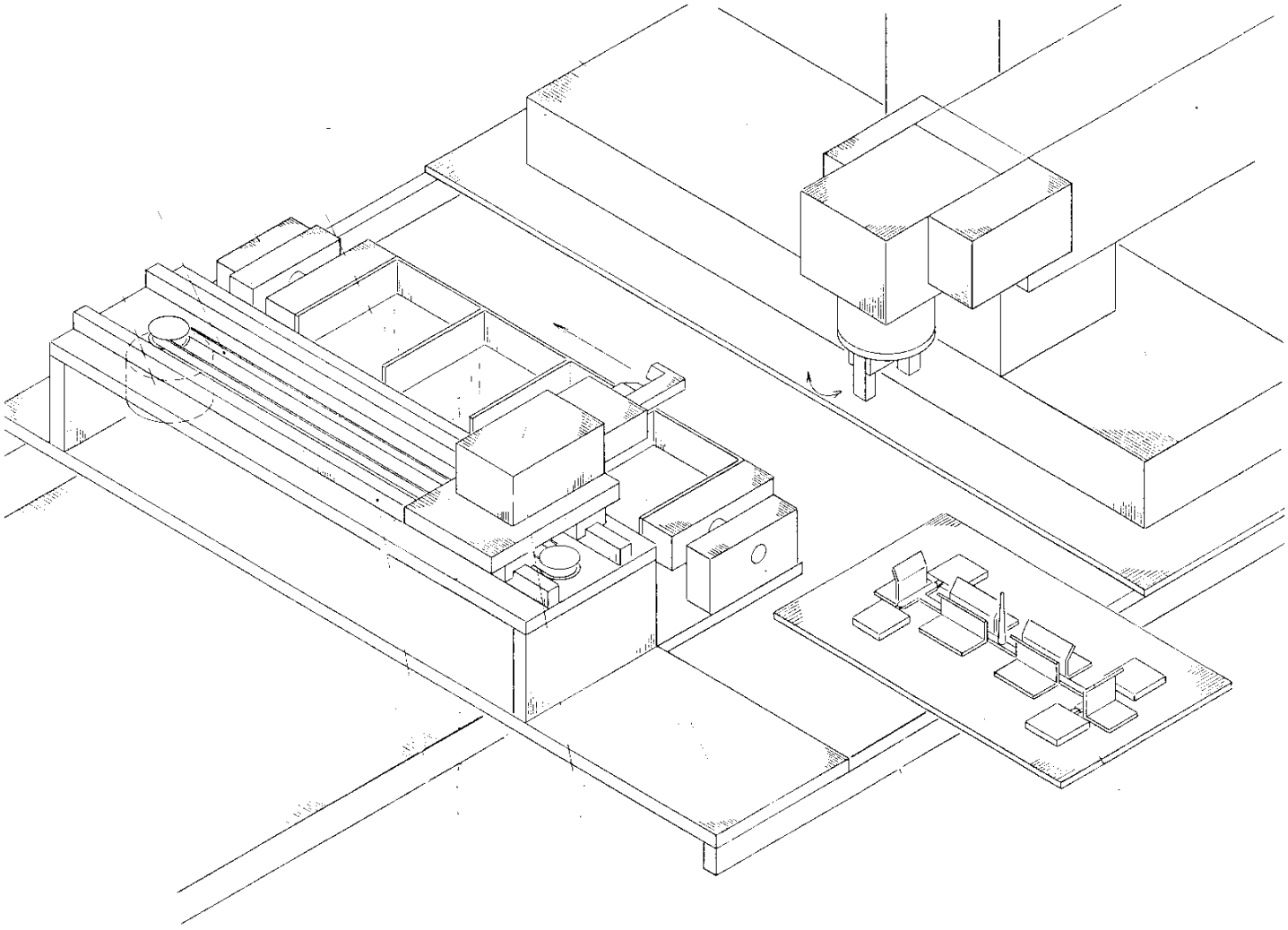




# SETUPS







# BLADES

Your choice of blades can make the difference between acceptable and unacceptable cuts. They can also help allow for greater variable in the program with out failure. When considering blades you should consider the following:

- If you intend to cut polycarbonate or glass reinforced plastics you will need carbide blades
- Your blade size must match your nipper type
- Can you modify your current blades to meet your needs
- Should you have Kawaguchi test your parts with different blades and select the best choice for you

The following 2 pages have many blade types and sizes for you to consider. All of the blades come in sizes to fit sizes 3,5,10,15,20 and 25 nippers. When ordering, refer to the part numbers and the pages that they are located on. To order you may either call us or order on-line at our web site (refer to the inside cover).

### *How often do blades need changing*

Unfortunately there is no reliable formula for figuring out blade life time. It may be a good idea to always have a spare set available. You may also resharpen blades or increase pressure to the cut to lengthen their lifetime.

### *Modifying blades*

You can modify your current blades by using files and grinders. You will need to be sure not to introduce too much heat as it may cause the blades to warp.

### *Having Kawaguchi test blades for you*

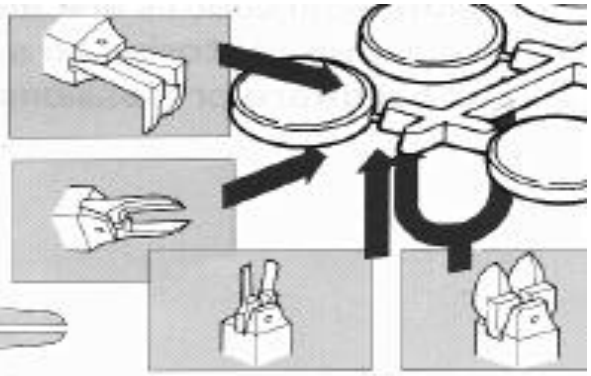
The Technical Service departments in the U.S. and Japan have amassed a great deal of experience when it comes to setups and we may be able to give you insight into the best way to degate your parts. We will test your parts with our selected setup, record the test and make the recording available to you either via the Internet or VHS.

### *Locating non conventional type blades*

If your setup requires a cutting system other than the ones offered in this manual you may need to contact a custom tooling company or you may contact our Technical Service departments for informational packets on alternative cutting systems. Also refer to the Kawaguchi web site.

# Various Spec Blades:

Even with the same work, various blades (with different shapes) should be used depending on the cutting direction. We can manufacture any special blade which is the most efficient and optimum for the object to be cut. Please do not hesitate to consult with us first.



Over-fit gate

Direct gate

Side gate + Over-fit gate

Disposable gate treatment

Film gate

Pin gate treatment

Bending

Caulking

Crimping sleeve

Connector

Punching

Extending

Sliding

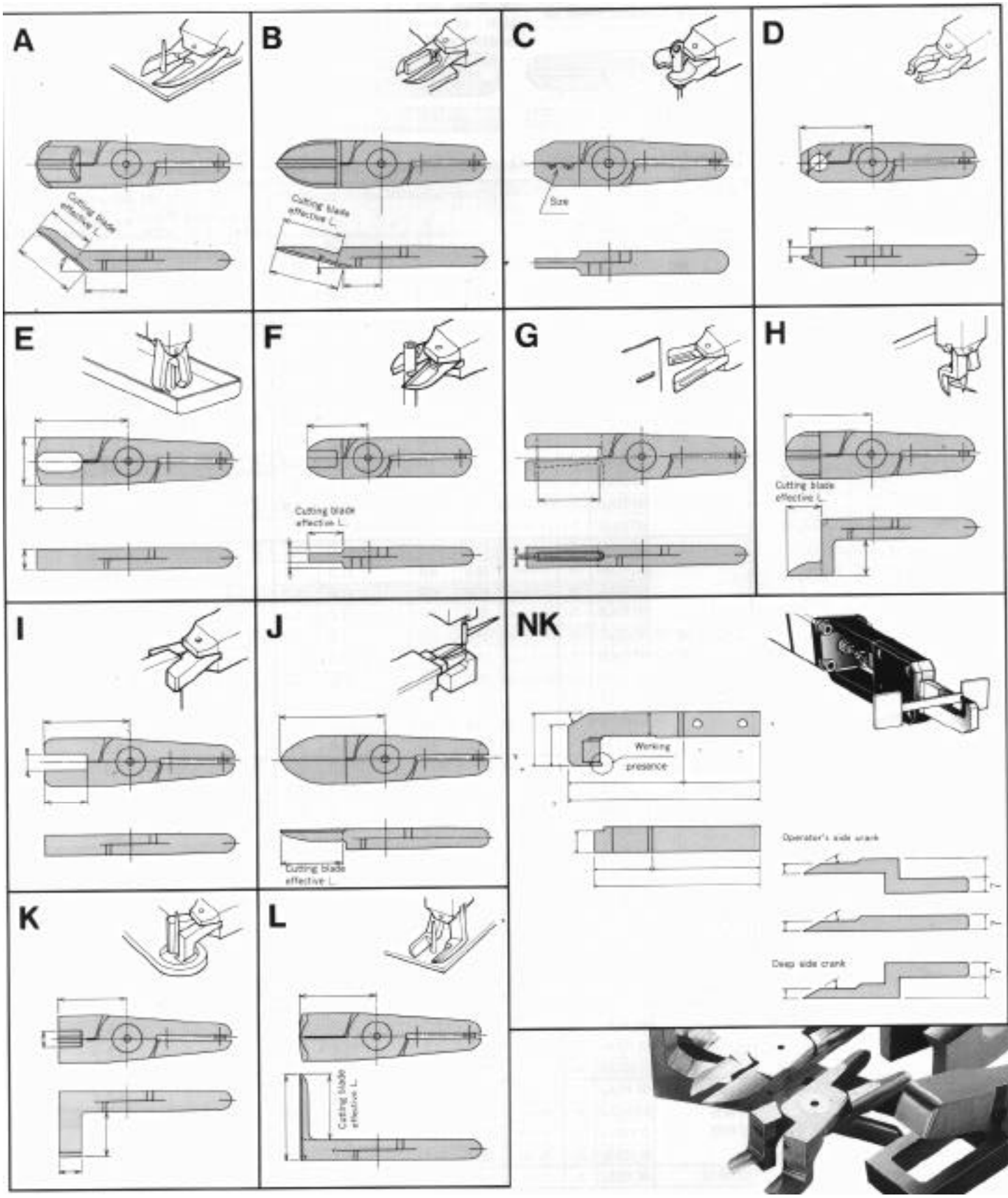
Cutting of stranded wire

Robot's hand

Partial cutting

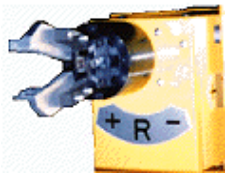
Scissors

For others, you can ask for blade re-polishing and special main body. Please consult with us first.


A
Cutting blade effective L.
B
Cutting blade effective L.
C
Size
D
E
F
Cutting blade effective L.
G
H
Cutting blade effective L.
I
J
Cutting blade effective L.
NK
Working presence
Operator's side crank
Deep side crank
K
L
Cutting blade effective L.

# CHUCK OPERATION

Many different types of chucks are available from Kawaguchi. Some of the stock chucks are displayed on the following pages. Centered and off set allow for different sprue lengths. Locating chucks allow for variables in the hand off. Bracketed chucks firmly hold flexible parts in place. The chuck types are often very specific to individual applications so you may need to send a part to Kawaguchi for evaluation before ordering.



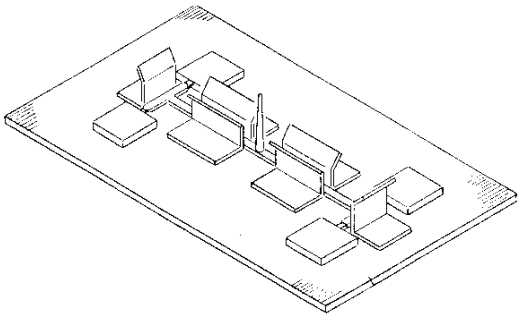

### *MAKING CUSTOM CHUCKS*

Most chucks are made from cast aluminum stock or solid cast plastic. Making a basic chuck takes only a little time for the average machinist, so you may want to manufacture chucks in-house.

### *CHUCKS THAT LOCATE*

When you have a problem making a hand off work due to a very inaccurate sprue picker you may need to use locating chucks. The graphic here indicates the added 'V' that can allow for a 2" variable. The larger the 'V' the larger the variance it can handle.

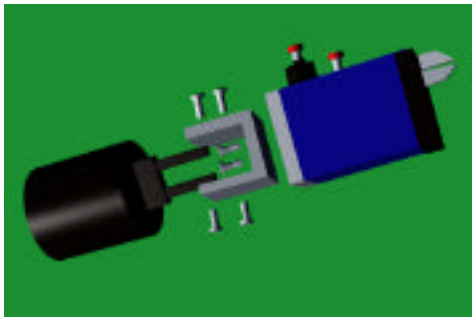
### *PNEUMATIC TRAYS*



In cases where a hand off is not feasible you may need to use a pneumatic tray. The 520 has extra pneumatic options already wired in so all that you have to do is add a solenoid. The tray is on a tilting pneumatic piston that sits at the angle of the picker waiting for a part to drop in. When the program starts, the tray lowers to horizontal and slide back into easy reach of the 520's axis. The 520 then grabs the part either via a special chuck or with the use of a tilting chuck.

### *CUTTING FROM THE CHUCK*

With a bracket you can place either a 3,5 or size 10 nipper into the chuck position. This is commonly used when cutting parts held by an accurate traversing robot. This also allows for greater speed of the cycle.



### *VACUUM CHUCKS*

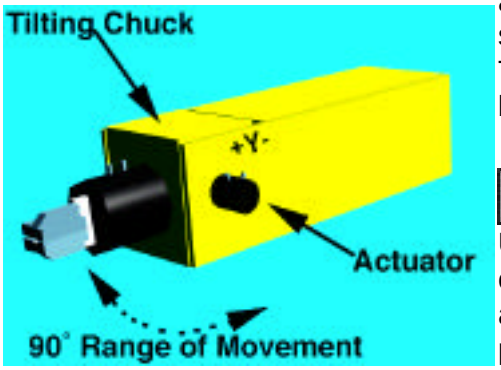
For cases of extremely flexible parts there is a vacuum chuck option. If you feel that you may need this option then please contact Kawaguchi America.

### *TILTING CHUCK OPTION*

The tilting chuck offers greater versatility to the 520. This option offers a 90˚ sway. It is commonly used with a pneumatic tray system or with cutters located vertically at the bottom of the Z axis. This is an option that is necessary when you can not make the hand off.

### *TILTING CHUCK COMPONENTS*

The tilting chuck can be added to a 520 that does not already have one. To the left you see the entire assembly. The 'Y' axis that is customized, the tilting chuck component and the solenoid. This operation is pneumatic and operates on hard stops with a 90˚ range of movement. The hard stops can be adjusted to increase or decrease the range of movement. The Solenoid operates as an ON, OFF function; meaning that it can not be programmed to stop between the hard stops.

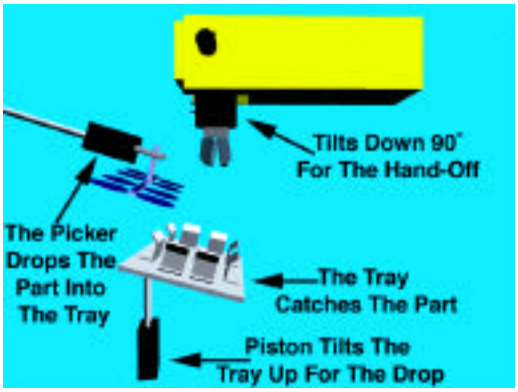



**⚠CAUTION**

Use the pin valves to control the rate of the tilt so that it does not jar itself or move too slowly. The motion of the tilting chuck should be smooth and it should not slam to either end. The pin valves are located on the pneumatic lines connected to the solenoid.

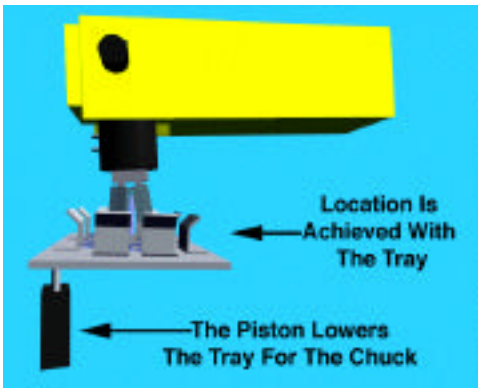
### *PROGRAMMING WITH THE TILTING CHUCK*

The tilting chuck adds a great deal of versatility to your K-cut but this manual is for general use so we will cover the most common scenario which is the tray hand off.

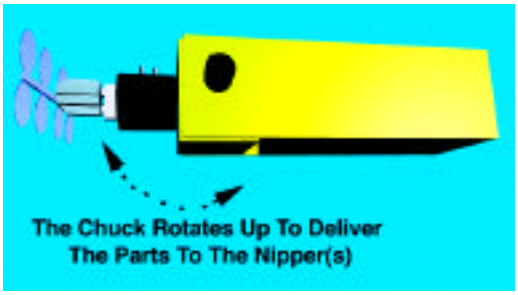



On your pendant the tilting chuck is **OP1** and the tilting tray is **OP2**. For the purpose of the hand off the set the origin so that the chuck is set vertically and the tray raised to meet the pickers angle for accurate nesting. Your first step should have the tray lowering and the chuck moving into position above it.

Next the 'Z' axis should lower so the chuck is in position to grab the sprue. At this point the chuck should go '**ON**' grabbing the sprue, then '**FREE**' loosening its grip. Now the chuck should lower onto the part for location of sprue depth and runner position and then the chuck should go back '**ON**', grabbing it in its new located position. Next the 'Z' axis should raise up. Now the axis should be positioned so that the chuck can raise without hitting anything. Finally the chuck should raise up, leaving the chuck and parts in a position for the cuts.

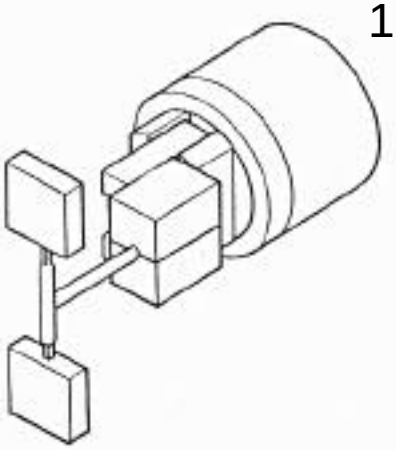



If Option raises too fast or slow you should first try to solve this with the pin valve air regulators on the pneumatic lines connected to the solenoid. If this doesn't solve the problem then look to the timer delays in channel '0' and set them appropriately.



# SAMPLE CHUCKS

1



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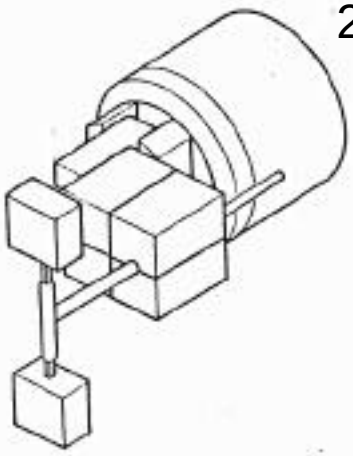

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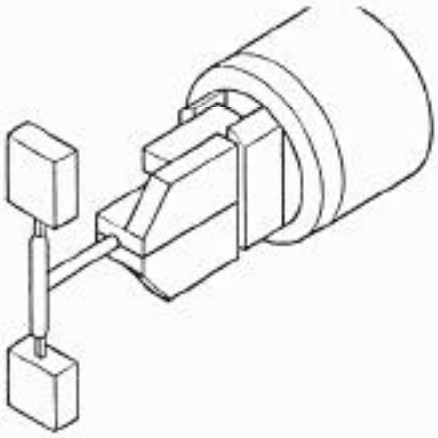
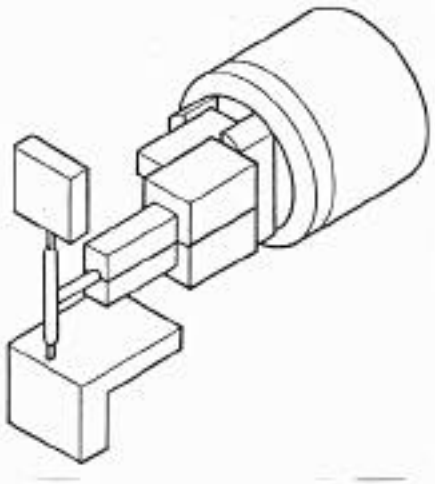


4



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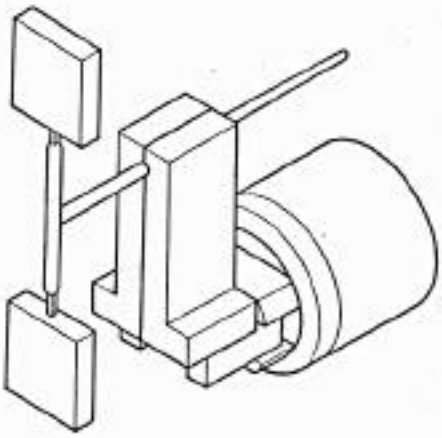
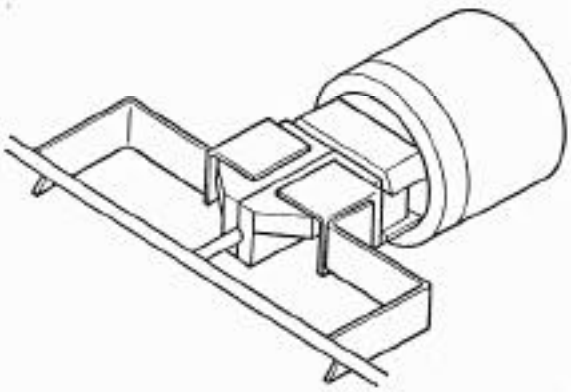
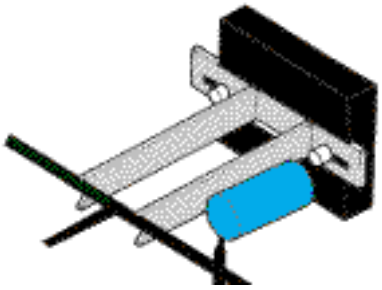


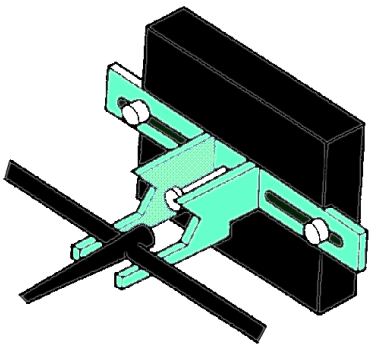
6

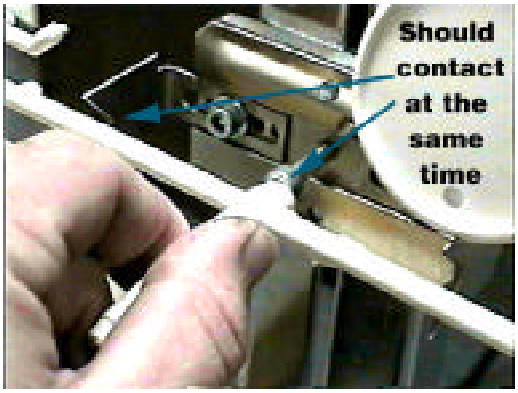


# LOCATORS



Location is the most critical factor in achieving repeatability. If you are noticing your 520 occasionally missing parts, but with no consistency, then your locator is most likely the culprit. Locators are commonly like the one pictured here. You can also locate from a tray, chuck or traversing robot.






***PROPER LOCATION***

The graphic here shows how your locator is properly used. The 'V' of the locator should connect with the runner at the same time as the end of the sprue contacts the center bolt.

***CUSTOM LOCATORS***

You may need to make custom locators for certain parts. The majority of our locators are made of heavy gauge sheet metal. If you wish to have our Technical Service department evaluate your part and suggest a location method, then please call.

If you have very long or flexible parts you may need to locate from the chuck position as well. To do this you will need a chuck ring and brackets or a brackets mounted into the chuck. (Refer to the section on chucks.)

# MOTION SENSOR

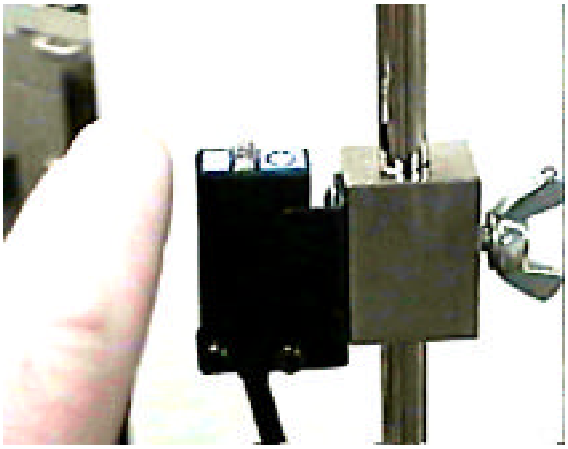
The motion sensor is how the 520 knows to start a program. With **Start** selected the motion sensor detects the presence of the sprue picker and signals the 520 to begin the cycle. The 520 will then run the steps leading up to the chuck **ON**. When the chuck closes on the sprue the 520 then stops. The when the sprue picker leaves the area the motion sensor then signals the 520 to continue with the cycle. This feature is to avoid having tugging contests between robots that would throw one or both off of their axis. This feature is also nice in that it allows the press to stop and start without operators having to stop the K-cut.

There are two lights on the top of the sensor that indicate that something has entered the field of vision. The reason that there are 2 is because it actually has two sensors. One to see the picker come and one to see it leave.

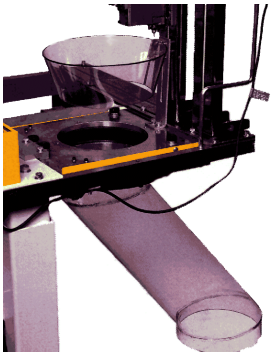
There is a plastic gain screw adjustment on the top of the sensor that allows you to increase or decrease its range of vision.

If the sensor is picking up background movement and starting the program at the wrong times you will either have to adjust its angle of view or reduce its gain.

On the front of the sensor there is a lens. This lens must be kept clean to ensure proper function.



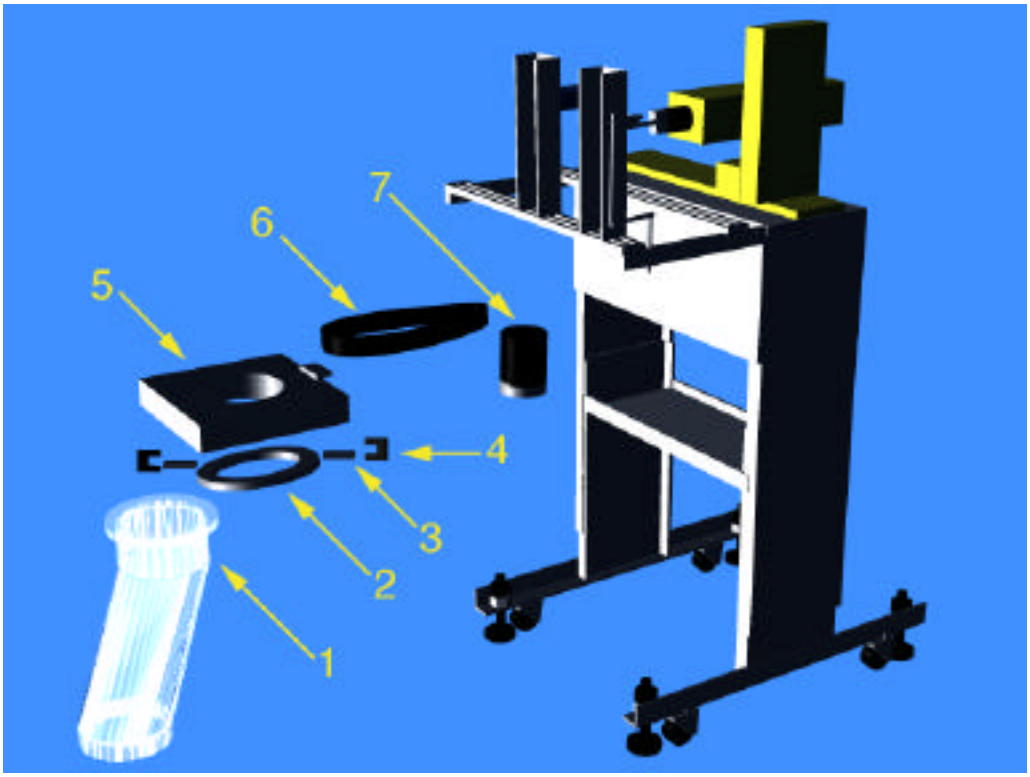
# SORTER



The optional sorter fixture is made to sort family molds into separate containers. The **Index** button on the pendant controls its operation. The sorter comes with a standard upper funnel and a lower diverter. Longer lower diverters can be attached to gain greater range. The sorter mounts to the frame front and can be easily adjusted within the **X** axis range. There are other fixture options that may solve sorting challenges but ultimately the sorting device is an excellent fixture that will add greater functionality to your K-cut 520.

The sorter comes with an installation manual which explains the connection process but it is recommended that a Kawaguchi technician perform the installation to ensure that it is done correctly.

The sorter can also be adjusted to perform within a limited range. The end of stroke sensors can be manipulated by moving the metal stroke guides.




1. The lower diverter
2. Rotating mounting bracket
3. Metal stroke guides
4. End of stroke sensor
5. Sorter body
6. Belt
7. Stepping motor

***PROGRAMMING WITH THE SORTER***

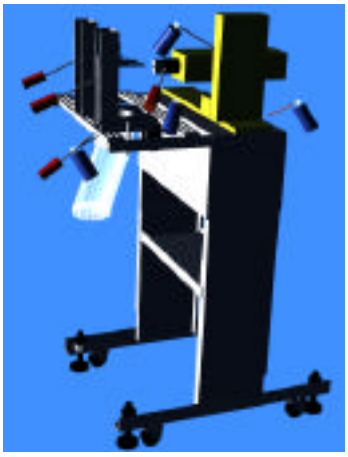
To program with the sorter the best suggestion we can give you is to say do not forget because adding it into a program can take some time.

With a four cavity family mold you will have four sorter positions. The first position should be at 0 so you do not program the sorter until after the first part has dropped. The sorter can move simultaneously with the other functions so there is no need to designate steps to the sorter. After the first part has dropped the next step will most likely be **Y-** to move out of the blade area. **Y-** out and then before setting that position in press **INDEX +** until you are over the position of your next drop and then press **SET**. Continue on to your next cut and after the cut repeat the procedure. At the end of the cycle the sorter will automatically return to the program origin position.

Generally speaking the sorter is very easy to use. If you need information on special catch chutes then look on our technical service web site or call our technical service department.

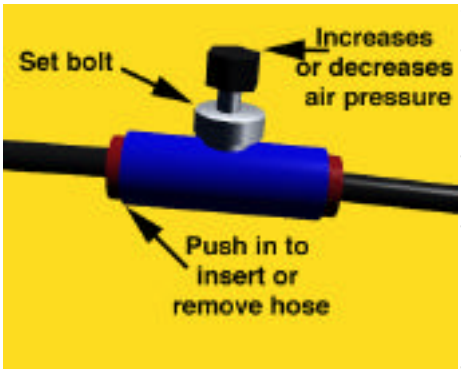
# MAINTENANCE

For the most part this is a very reliable piece of equipment that runs almost maintenance free. This can cause neglect. Despite the fact that it will run virtually without any attention you will still need to inspect it for loose bolts and nuts, built up plastic shards, blade sharpness, condensation and lubrication. Also frequent careful inspection of electrical and air functions, tubes and cords is necessary.



- Check all the external visible bolts, nuts and screws frequently
- Make sure that there is no build up of plastic shards in, on and around the 520's axis and that it and the sensor are clean
- Keep the axis of motion clean and lubricated (use the supplied aerosol lubricant)
- Check to be sure that the blades are sharp enough to function properly
- Check the regulator moisture trap, if it contains water then press the button on the bottom to drain it
- Check all cords and hoses

# PIN VALVES




The pin valves can be an integral part of your cutting success. You can use them to increase or reduce the air pressure to the pneumatics. In the case of the tilting chuck you will need to reduce the air flow until the motion is smooth. To reduce the flow turn the knob clockwise and to increase, turn the knob counter clockwise.

If when the nippers cut, your parts 'fly' off too fast, you may use a pin valve to reduce the air flow to the nipper throw. This will cause it to move more slowly and that will solve the problem. If your nipper is tearing your parts off rather than cutting you may first reduce the throw distance with the set screw located on the nipper and then use a pin valve to reduce the air flow to the cut.

# MAKE IT FASTER

To improve speed there are a few helpful tips. To perform these tips you should first be familiar with channel 0 and editing steps.

First, minimize your movements, cut out any extra motion. For instance make the hand off direct so **Step 1** is **Chuck On**. Then put your locators as close to the **Step 1** position as possible. Finally make your nipper(s) as close as you can too.

Second make sure that **Step 0** is set to **HI**.

If you are still not making it you should now go to channel 0 to minimize every possible timer delay. The most gained time should be in **St Stby** and **ChkOn**. These two steps will cut the time down in the hand-off so be careful not to cause a collision.

If at this point you are still having problems you will now need to consider adding more nippers to solve the timer problem.

# SETUP HINTS & IMPROVING ACCURACY

There are numerous methods of improving accuracy and all of them are very specific to the part. In this case we can not offer an in-depth answer so we have deemed it best to offer a continually updated file at our web site that shows accuracy improving methods for parts that we do know. If you can not find your answer at the web site, it is highly recommended that you call our Technical Service department with your questions.

# ERROR CODES

**ERROR CODES CAN BE RESET BY PRESSING 'CLEAR'**

| Code | Meaning | fix |
|---|---|---|
| 02 | Main channel step 99 exceeded | Decrease the number of steps |
| 20 | Different mode activated | Change the mode |
| 22 | Programming in a channel other than 1-20 | Program only in channels 1-20 |
| 23 | Origin is not restored | Restore origin |
| 25 | A blank step or 00 step | Return to origin |
| 27 | An attempt was made to insert a step at 00 | Don't try to insert steps at 00 |
| 28 | An attempt was made to delete step 00 | Step 00 can not be deleted |
| 77 | Counter limit | Clear the counter |
| 82 | 'X' axis (- direction has been exceeded) | Restart and restore the origin |
| 83 | 'X' axis (+ direction has been exceeded) | Restart and restore the origin |
| 84 | 'Z' axis (- direction has been exceeded) | Restart and restore the origin |
| 85 | 'Z' axis (+ direction has been exceeded) | Restart and restore the origin |
| 86 | 'Y' axis (- direction has been exceeded) | Restart and restore the origin |
| 87 | 'Y' axis (+ direction has been exceeded) | Restart and restore the origin |
| 88 | 'R' axis (- direction has been exceeded) | Restart and restore the origin |
| 89 | 'R' axis (+ direction has been exceeded) | Restart and restore the origin |
| 90 | OP axis counter clockwise | Restart and restore the origin |
| 91 | OP axis clockwise | Restart and restore the origin |

# TROUBLE SHOOTING

*For updated information on trouble shooting please refer to our web site.*

**⚠CAUTION**

Before checking any electrical or moving part you must first make sure that the 520 is unplugged and that the air is disconnected.

## MECHANICAL

If the 520 stops operating check all electrical connections and air connections. Remove and carefully reinsert the memory card. Make sure that it is not erroring and restart it. Be sure that all of the bolts and fixtures are tight. Make sure that the robot has been properly grounded. Make sure that all of the axis have operational stepping motors and belts, that they are free of obstructions and that they are well lubricated.

If an axis stops operating first check for an obstruction in the track. Next check to see if the stepping motor runs while the axis is selected. If the motor is operating but that axis is not moving then you will have to check the belt. If the motor is not operating when selected then you should make sure that all of the electrical wires connected to it are plugged in, secure and functional. If they are then you should remove the motor and test it, if it works then there may be a problem with the sending unit. If it does not work then clearly you will need to replace it.

If the robot is having problems with the pneumatics then you will first need to test all of the hoses, then the pin valves, the air in, the air regulator and finally the manifolds and solenoids.

If a nipper blade closes but does not open, then you will need to open the nipper, check the blade return spring and grease. Make sure that there is no obstruction or material contaminating the piston.

# PROGRAM

There are limitless possibilities here but most of the solutions are simple. If you watch your program closely you should notice that the hand off is smooth and consistent. Make sure that the location is consistent. Be sure the chuck is firmly grasping the part. Check the approaches and retractions from all of the fixtures to make sure that they are smooth and do not bump. Be sure that you are using the appropriate fixtures. Are the blades large enough, is the location fine, is the chuck appropriate, etc.? This portion is really quite basic. The only difficulty usually comes in meeting vestige requirements. Here you will need to determine if your cutting system is adequate. Check the blades first. Check the nipper throw and the pin valves. Determine if you will need a 'backer' for the blades to push against.

If you are having problems with the cuts you can check your program to be sure that you have found the middle ground to the approaches and allowed for the greatest level of variable. Sometimes you will find that your program is fine and all of the editing you do does not seem to solve the problem. Avoid the time wasted editing by carefully watching a number of cycles to make sure that the errors are consistent. If they are consistent then you can edit in a simple solution. You can assume that the 520 is repeating to within 0.03 of an inch so if the errors are not reasonably consistent then your problem is elsewhere. We suggest that you be sure that the location is adequate and that the parts are firmly held by the chuck. If you still can't isolate the problem then you better call technical service.

### *THE 520 WILL NOT RETURN TO ORIGIN AFTER PROGRAMMING*

If after you have programmed you can not get it to back to the origin, then most likely you have not exited program mode by pressing the Enter/Change button.

### *THE 'Y' AXIS GOES OUT OF POSITION OFTEN*

In your approach to the location you have not selected **Chuck Free**. Edit the steps involved in sliding the part into the chuck so that the chuck is '**Free**' before moving in.

### *THE OTHER AXIS ERROR OFTEN*

You will need to watch the cycle to determine where the parts are 'hanging up'. If you are experiencing regular errors in the axis it is very likely that there is a 'snag' somewhere. When you find the 'snag' you will need to program around it. If the '**R**' axis is going out very often, you may have a very heavy or long runner and you will need to program in rotations of the '**R**' axis to be slower.

### *AT THE END OF THE CYCLE IT CALIBRATES VERY SLOWLY*

The speed of the calibration is set in step 0, (also known as the program origin). To change the speed of the step, press **Origin** while in **Manual** mode. Press **Enter/Change**, press **HI** and then press **Change Entry**. Now test it.

### *THE PROGRAM INITIATES TOO SLOWLY OR AFTER THE CHUCK SHUTS IT SITS TOO LONG*

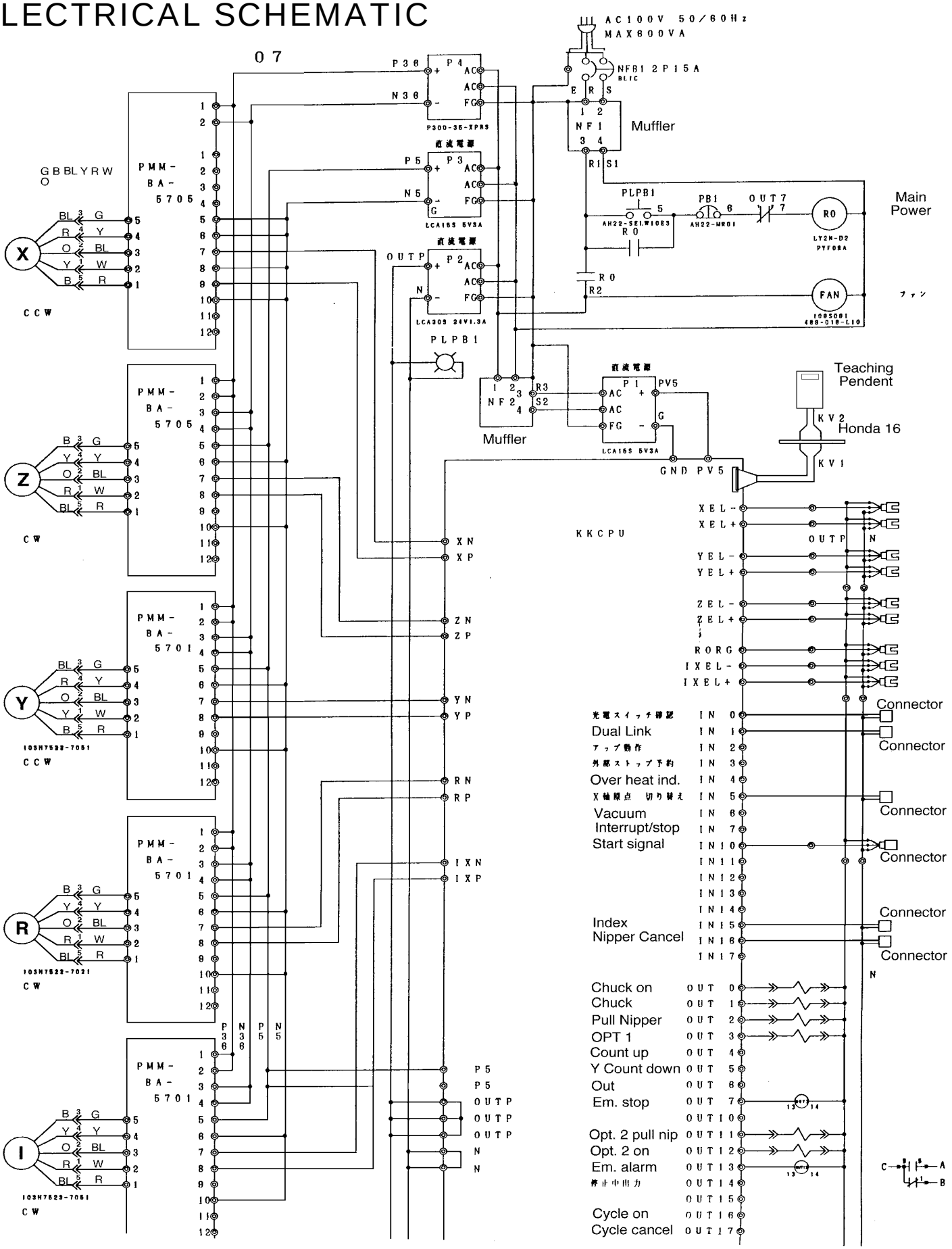
These are both timer delay issues, to solve them refer to the section on timer delays.

### *THE HAND OFF IS INCONSISTENT*

First make sure the 520's levelers are down and all contacting the floor, then check to make sure that it is not 'walking'. Next check the height adjustment knobs to be sure that they are tight and finally restart the 520 so that it may recalibrate. If the problem still exists then you can safely blame the sprue picker. To solve this problem you will need to consider either a tray or a locating chuck.

For very in-depth answers to trouble shooting questions you may need to contact the Kawaguchi Technical Service department.

# ELECTRICAL SCHEMATIC



# KAWAGUCHI AMERICA LTD.

## TRIAL RUN AGREEMENT

Leased to:_____ Phone#_____
Address:_____ Contact:
_____

## EQUIPMENT

Model **520** Serial # Sorter ☐ Nipper / Blade type(s)

Chuck type(s)

1. _____
2. _____
3. _____
4. _____
5. _____

| | Nipper | Blade |
|---|---|---|
| 1. | _____ | _____ |
| 2. | _____ | _____ |
| 3. | _____ | _____ |
| 4. | _____ | _____ |
| 5. | _____ | _____ |

CUSTOM ATTACHMENTS:

_____
_____
_____
_____
_____
_____
_____

**TRIAL CONDITIONS FOR THE ABOVE EQUIPMENT:**

The customer assumes all responsibility for equipment while it is in their possession and promises to either purchase or return these items in good condition; naturally wear from reasonable use is expected.

During the trial period, the customer is liable for any loss, theft, damage or destruction of this property under this agreement. All equipment lost or damaged beyond repair will be paid for by the customer at the regular replacement price. All damaged equipment which may be repaired, will be repaired upon return and the cost for such repairs will be paid by the customer.

The Kawaguchi America K-cut 520 trial period is 30 days unless otherwise agreed upon, in writing, by Kawaguchi America. The trial period begins upon the signing of this contract and concludes within 30 days of that start date, at which time the customer must either purchase the robot, pay lease cost or return it.

The customer agrees that charges for repair, replacement, damage, or other adverse changes to the condition of the equipment from the time that it was entered into the trial run will be paid by them upon termination of the trial run. (Kawaguchi America LTD. reserves the right to terminate the trial run without advance notice.)

Date_____ Customer Signature_____

Kawaguchi Technician_____

**This contract is not valid without both the customer's and a Kawaguchi America LTD. technician's signatures**

# THE K-CUT 520
# ONE YEAR LIMITED WARRANTY

Kawaguchi America Ltd. will repair your K-cut if it is defective in materials or workmanship. The warranty is good for one year from the date of purchase.

Should you feel that your K-cut is defective and want to take advantage of this warranty then contact your nearest authorized technical service representative by either fax, phone, e-mail or mail to inform them of your problem. Kawaguchi America Ltd. will then schedule the proper warranty work necessary to repair your K-cut. Kawaguchi America Ltd. will assume the cost of parts and labor involved in repair or replacement cost (the owner will be responsible only for the shipping costs).

This warranty covers only parts or components which are defective and does not cover repairs due to normal wear, misuse, accidents, defective power supply or lack of proper maintenance.

All warranty repairs done to the K-cut 520 must be performed by Kawaguchi America Ltd. or an authorized service dealer. Repairs or attempted repairs by anyone other than Kawaguchi America Ltd. or an authorized service dealer will not be covered by this warranty.

Kawaguchi America Ltd. is not responsible for any costs or expenses of providing substitute equipment or service during periods of malfunction or nonuse.

Some states do not allow exclusion of incidental or consequential damages or limitations on how long an implied warranty lasts; therefore those limitations may not apply to you.

This limited warranty gives you specific legal rights and you may also have other rights which vary from state to state.

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